9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	х		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		<u> </u>
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: $R>UCL, J(+)$ only; $LCL, J(+)/UJ(-)$; $10\% J(+)/R(-)$. RPD failures should be flagged "J" (+ only).		·	

Note:

The LCS had recoveries outside the QC limits; however, the LCS is associated with the field blank. Therefore, no qualification of data was required.

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
10.1	continuing calibration?			X

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			x
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	2 2 78 78 78 78 78 78 78 78 78 78 78 78 78		x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.		************	x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		х	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.	***************************************		

13.0 Data Completeness

		Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)			
13.2	Number of samples:			
13.3	Number of target compounds in each analysis: 21			
13.4	Number of results rejected and not reported:			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)			
	% Completeness 100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

7/11/2005

Project Number:

Review Level:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 003 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Certain analytes were qualified estimated due to surrogate recoveries and duplicate %RPDs.

Field IDs:

AA-P-5-34	AA-P-8-122
AA-P-7-72	AA-P-7-92
AA-P-6-70	AA-P-6-70-D
AA-P-6-110	AA-SLAY-3-50
AA-SLAY-3-70-D	AA-P-7-110
AA-P-5-74	AA-P-5-94
AA-P-6-30	AA-P-6-50

AA-P-8-122-D SA-Q-2-FB

AA-P-6-90

AA-SLAY-3-70

AA-P-5-54

AA-P-5-114

1.0 Chain of Custody/Sample Condition

-			Yes	No	NA
L	1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
	1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the surrogate and MS/MSD recoveries were outside the QC limits.

The narrative also suggested that the CCV had recoveries outside the QC limits; however this is beyond the scope of this review, although it should be noted.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached			
2.2	Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	 -

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

[Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?	The second second second second second	X	
3.3	Do any field/trip rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of CFs and %RSDs to verify correct calculations are being made.			v

5.0 Continuing Calibration

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $<$ 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			X

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all sampl	Are all samples listed on the appropriate Surrogate Recovery Summary Form?				-	
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				X	1	
6.3	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					х	
6.4	If No in Secti	ion 6.3, is any sam	ple dilution factor greater than 1	0? (Surrogate recoveries may be diluted out.)		X	
		> UCL	10% to LCL	< 10%		·	
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: The surrogates were recovered outside the QC limits for sample AA-P-5-94. The following qualification was applied.

Field ID	Analyte	Surrogate Recoveries	Surrogate Limits	Qualification	Code
AA-P-5-94	МСРР	165	70-130	J	S

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

			Yes	No	NA
	7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
	7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
	7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		X	
		Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with			
İ		other QC criteria and determine the need for qualification of the data for samples from the same site/matrix.			
		Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

Several analytes were recovered outside the QC limits in the MS/MSD. However the LCS sample recoveries were within QC limits; therefore, no qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: $R>UCL$, $J(+)$ only; LCL , $J(+)/UJ(-)$; $I(+)/R(-)$. RPD failures should be flagged "J" (+ only).		-	

Note:

9.0 TCL Identification (Code W)

_			Yes	No	NA
	0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
L	9.1	continuing calibration?			Х

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			X

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for Herbicides analysis?	X		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		х	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			-

Note: The sample AA-P-6-70 and its duplicate had %RPD outside QC limits; the sample is qualified below.

Field ID	Analyte	Qualification	Code
AA-P-6-70	МСРР	J	F
AA-P-6-70-D	МСРР	J	F

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for		-		
	soil sample.)		A		
12.2	Number of samples:	20			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.2 \times 12.3) - 12.4) / (12.2 \times 12.3)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
Date:	7/12/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS003
		Review Level:	Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Several analytes were qualified as estimated due to lab duplicate RPDs and MS/MSD recoveries outside QC limits.

Field IDs:	AA-P-5-34	AA-P-6-70	AA-P-6-70-D
	AA-P-8-122	AA-P-6-90	AA-P-6-110
	AA-P-8-122-D	AA-SLAY-3-50	AA-SLAY-3-70
	AA-P-7-72	AA-SLAY-3-70-D	AA-P-7-110
	AA-P-7-92	AA-P-5-54	AA-P-5-74
	SA-Q-2-FB	AA-P-5-94	AA-P-5-114
	AA-P-6-30	AA-P-6-50	

1.0 Chain	of Custody/Sample Condition/Raw Data		ICP		I	CP-M	1S	(GFAA	1	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	X									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х						Kibas			x		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?											Х	
1.4	Does sample preservation, collection and storage meet method requirements? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	X									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.										X		

Note: The laboratory case narrative indicated that the MS/MSD spike samples had recoveries outside QC limits. Laboratory duplicate RPDs were outside QC limits.

2.0 Holding	2.0 Holding Time (Code H)		ICP		I	CP-M	S	(GFA.A	Α	C	-Hg	
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28 days, other metals: 6 months) See attached Holding Time Table.		X								·	x	
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.			·									

Note:

3.0 Instrun	nent Calibration (Code C)						ICP		I	CP-M	S	G	FAA	C'	VAA-	Hg
						Yes	No	NA	Yes	No	NA Y	Yes	No N	A Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand				blank + one standar	d;		х								
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: J((+)/UJ(-).							83				X
3.3	Was an initial calibration vano, use professional judgm					If		х				State on the				х
3.4	Was continuing calibration whichever is more frequer data and note in reviewer is	it? Action: 1						x								х
3.5	Are all calibration standard (80%-120%) and other Me	•	`	CCV) within the co	ontrol limits? Mercu	ry		х								х
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)						Š	23 S				
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%						8					
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%											П

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		I	CP-M	[S	(GFA/	Ä	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										X	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		X									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									X	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP In	terference Ch	eck Sample (l	ICS) (Code N)					ICP	_	I	CP-M	IS		GFA.	4	C,	VAA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1					at least twice evaluent) for ICP-MS?	ery 8 hours) and at the	e		х									
5.2	Are the IC	S AB recover	ies within 80% -	120%?	·				х					<u> </u>				
5.3	Are the re	sults for unspi	ked analytes (in	ICS A) < + IDL?					х									$\overline{}$
5.4	If not, are	the associated	sample Al, Ca, I	Fe, and Mg conc	entrations less tha	n the level in the ICS?			х					1				
	Action:	Not Spik	ed Analytes	Spiked	analytes (ICS AI	3 analytes)				1								
		<-IDL	> IDL	< 50%	50% - 79%	> 120%	V. 2000			(1998) (152:								
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												П

6.0 Labora	tory Control	Sample (LCS)	(Code L - Re	covery, Code E	- RPD)			ICP		I	CP-M	[S	(GFA.	4	CV	/AA-	Hg
F							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1					uency (one per 2 ot associated wit	0 samples, per batch, per hatch,	r x									Х		
6.2		recovery outsi as per EPA-E		limits? (Aqueo	us limits: 80% -	120% - except Ag and St);	х									X	
,	Action:	Sc	olid		Aqueous			F) - (-						* * * * * * * * * * * * * * * * * * * *				
		< LCL	> UCL	< 50%	50% - 79%	> 120%											7.79	П
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

Note:

7.0 Labor	atory Duplicates (Code K)		ICP		IC	CP-M	IS	. (3FA.	1	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.										X		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment Note in worksheet.		X									X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).		х								X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	(spinse)			37777								l

Note: Sample AA-P-5-34 was spiked. Certain analytes were outside QC limits and are qualified below.

Field ID	Analyte	Qualification	Code
AA-P-5-34	Aluminum	J	K
AA-P-5-34	Iron	J	K
AA-P-5-34	Zinc	J	K

Spike S	Sample Analysis -	Pre-Digestion (Code	e M - Recovery, Code D -	RPD)		ICP		I	CP-M	IS	(GFAA	4	CV	/AA-	Hg
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	N
8.1	batch, per ma		Action: If no, J(+), with	frequency (one per 20 samples, pe professional judgment, analytes no										X		
8.2		lank used for the M		es, J(+) with professional judgment		x					*****				x	Γ
	Note: Matrix in an SDG.	spike analysis may be	e performed on a field blan	k when it is the only aqueous sample	9											
8.3		nit of 75-125%? (No	-	entration, are spike recoveries within alytes with concentration > 4 x spike	200000000000000000000000000000000000000	х								x		
		%R > 125%	30% < %R < 74%	%R < 30%												Γ
	Positive	J	J	J												Γ
	Non-detect	None	UJ	R												Γ

Note: Several analytes were outside the QC limits. Qualifications due to these analytes are listed below.

Field ID	Analyte	Qualification	Code
AA-P-5-34	Aluminum	J	M
AA-P-5-34	Potassium	J	М
AA-P-5-34	Zinc	J	M

9.0 Instrument Detection Limits (IDL)		ICP		I	CP-M	[S	(GFA/	4	CV	/AA-	Hg
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1 Are all IDL equal to or less than the reporting limits specified?			х									х

Note:

10.0 ICP Se	erial Dilutions (Code S)		ICP		I	CP-M	IS	(GFA/	4	C'	VAA-	·Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	X											П
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, $J(+)$.	X											

11.0 Field Duplicate Samples (Code F) ICP ICP-MS GFAA CVAA-Hg Yes No NA Yes No NA Yes No NA Yes No NA 11.1 Were any field duplicates submitted for metal analysis? Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)

Note: Samples AA-SLAY-3-70, AA-P-8-122, and AA-P-6-70 are parent samples for field duplicates AA-SLAY-3-70-D, AA-P-8-122-D, and AA-P-6-70-D.

12.0 Result V	Verification (Code Q)		ICP		I	CP-M	(S	(3FAA	1	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	33.00		х	00070777								х
12.2	Were all dilution reflected in the positive results and detection limits?	(300		х									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)							
13.2	Number of samples:	20		0		0		20
13.3	Number of target compounds in each analysis:	22		0		0		1
13.4	Number of results rejected and not reported:	0		0	-	0		0
	% Completeness = $100 \times ((13.2 \times 13.3) - 13.4) / (13.2 \times 13.3)$						_	
	% Completeness	100	#	###		###		100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Bart Brandenburg

7/12/2005 Date:

Laboratory

Severn Trent Laboratory - Savannah

Test Name:

Ammonia

Project Name:

Sauget - Area 2

Project Number:

21561510.60011

SDG No.:

SAS 003

Review Level:

Level III

Method No.:

350.1

Major Anomalies:

No analytes were rejected.

Minor Anomalies:

One sample was qualified based on field blank analysis.

Field IDs:

AA-P-5-34	AA-P-8-122	AA-P-8-122-D
AA-P-7-72	AA-P-7-92	AA-P-7-110
SA-Q-2-FB	AA-P-6-70	AA-P-70-D
AA-P-6-90	AA-P-6-50	AA-P-6-110
AA-SLAY-3-50	AA-SLAY-3-70	AA-SLAY-3-70-D
AA-P-5-54	AA-P-5-74	AA-P-5-94
AA-P-5-114	AA-P-6-30	

1.0 Chain of Custody/Sample Condition

_			Yes	No	NA
L	1.1	Do Chain-of-Custody forms list all samples analyzed?	X *		
	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
	1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the			
	temperature of the cooler was elevated ($>$ 10 $^{\rm o}$ C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, $J(+)/R(-)$.		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?	X		
	Action: Positive sample results $<5X$ the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.		The state of the s	
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			X

Note: The field blank reported a detection of ammonia at a concentration above the MDL. The following sample is qualified.

Field ID	Analyte	Qualification	Code
AA-P-5-34	Ammonia	U	X

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			X
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			Х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			х

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x	,	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		X	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).	A personal control of the control of		

Note: The MS/MSD samples had recoveries below the QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Limits	Qualification	Code
AA-P-5-34	Ammonia	77/77	1	90-110/30	J	М
AA-P-6-70	Ammonia	22/25	5	90-110/30	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			х
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

8.0 Analyte Identification

Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			Yes	No	NA
RRT units of the standard RRT in the continuing calibration?	Q 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06			
	8.1	RRT units of the standard RRT in the continuing calibration?			X

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			Х
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			X

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted for ammonia analysis?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	receipt the second of the seco		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Samples AA-SLAY-3-70, AA-P-8-122, and AA-P-6-70 are parent samples for field duplicates AA-SLAY-3-70-D, AA-P-8-122-D, and AA-P-6-70-D.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.			
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.		X	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Checaqueous sample, 90% for soil sample.)	k QAPP or use 95% for	*		
12.2	Number of samples:	20		.,	
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)			····	
	% Completeness	100			

DATA VALIDATION WORKSHEET **VOLATILE ORGANIC ANALYSIS**

Reviewer:

Date:

Bart Brandenburg

Laboratory

8/4/2005

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS004

Level III

Major Anomalies:

Several samples had analytes rejected due to internal standard recoveries.

Minor Anomalies:

Several samples had analytes qualified due to surrogate, LCS, and internal standard recoveries.

Field IDs:

SA-Q-2-SS-0.5	SA-Q-2-SB-4	AT-Q-24-SB-6
AT-Q-24-SS-0.5	AT-Q-26-SB-6	AT-Q-26-SS-1.5'
AT-Q-27-SB-6'	AT-Q-28-SB-6'-DUP	AT-Q-27-SS-1'
AT-Q-28-SB-6'	SA-Q-3-SB-6	AT-Q-28-SS-1.5'
SA-Q-3-SS-0.5	SA-Q-4-SS-0.5	SA-Q-3-SB-6-D
SA-Q-3-WS-12	AT-Q-28-WS-16'	SA-Q-4-SB-6
AT-Q-29-SB-6'		

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the MS/MSD, LCS, surrogate, and internal standards had recoveries outside OC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix Preserved Aromatic All others			
	Aqueous No 7 days 14 days			
	Yes 14 days 14 days			
	Soil/Sediment 4 °C ± 2 °C 14 days 14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, $J(+)/R(-)$.		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			х
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			х

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks) (Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

			Yes	No	NA
	4.1	Is a Method Blank Summary form present for each batch?	x		
	4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
i	4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		X	
		Action: Positive sample results <5X (or 10X for common volatile lab contaminants-methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
	4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	Land Million Balling		х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Y es	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?		,	x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		-	х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.		e e e	х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			х

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?			
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples	\$?	x	
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			х
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/N or diluted samples, then no reanalysis is required.	MSD		
	> UCL 10% to LCL < 10%			
,	Positive J J J			
	Non-detect None UJ R		., ,	

Note: Several samples and their reanalyses had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate recoveries	Surrogates	Surrogate Limits
SA-Q-2-SS-0.5	60	BFB	68-121
SA-Q-2-SS-0.5RA	58	BFB	68-121
AT-Q-27-SB-6'	44	BFB	68-121
AT-Q-27-SB-6'RA	62	BFB	68-121
AT-Q-28-SB-6'-DUP	44	BFB	68-121
AT-Q-28-SB-6'-DUPRA	55	BFB	68-121
SA-Q-3-SS-0.5	44	BFB	68-121
SA-Q-3-SS-0.5RA	43	BFB	68-121
SA-Q-3-WS-12	38 / 62	BFB / TOL	68-121/65-128
SA-Q-3-WS-12RA	67 / 56	BFB / TOL	68-121 / 65-128
SA-Q-4-SB-6	56 / 56 / 14	BFB / DBFM / TOL	68-121 / 66-127 / 65-128
SA-Q-4-SB-6RA	60	TOL	65-128

BFB = 4-Bromofluorobenzene DBFM = Dibromofluoromethane TOL = Toluene-d8

Field ID	Analyte	Qualification	Code
SA-Q-2-SS-0.5	All VOC analytes	J/UJ	S
SA-Q-2-SS-0.5RA	All VOC analytes	J/UJ	S
AT-Q-27-SB-6'	All VOC analytes	J/UJ	S
AT-Q-27-SB-6'RA	All VOC analytes	J/UJ	S
AT-Q-28-SB-6'-DUP	All VOC analytes	J/UJ	S
AT-Q-28-SB-6'-DUPRA	All VOC analytes	J/UJ	S
SA-Q-3-SS-0.5	All VOC analytes	J/UJ	S
SA-Q-3-SS-0.5RA	All VOC analytes	J/UJ	S
SA-Q-3-WS-12	All VOC analytes	J/UJ	S
SA-Q-3-WS-12RA	All VOC analytes	J/UJ	S
SA-Q-4-SB-6	All VOC analytes	J/UJ	S
SA-Q-4-SB-6RA	All VOC analytes	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

	•	Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X	-	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

Sample AT-Q-29-SB-6' was spiked and analyzed for VOCs, with recoveries outside QC limits. These analytes were reported non-detect.

No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	i i i i i i i i i i i i i i i i i i i		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: Several analytes were outside QC limits for the LCS samples. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-10962	2-Butanone	15	30-149
LCS 680-10962	2-Butanone	15	30-149
LCS 680-10962	2-Butanone	15	30-149

Field ID	Analyte	Qualification	Code
SA-Q-4-SB-6RA	2-Butanone	J	L
AT-Q-29-SB-6'	2-Butanone	J	L

10.0 Internal Standards (Code I)

		Yes	No	NA
10.1	Are internal standard areas for every sample and blank within upper and lower QC limits?		x	
	Area > +100% Area < -50% Area < -10%			
	Positive J J J			
	Non-detect None UJ R	·		
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?	× ×		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Several samples had internal standards outside QC limits; qualifications are listed below.

Field ID	Analyte	IS Recoveries Low/High	Internal Standards	Qualification	Code
SA-Q-2-SS-0.5	All VOC analytes	. IS Recoveries Low	CBZ	J/UJ	I
AT-Q-27-SB-6	All VOC analytes	IS Recoveries Low	DFB / CBZ	J/UJ	I
AT-Q-28-SB-6'	All VOC analytes	IS Recoveries Low	DFB / CBZ	J/UJ	I
SA-Q-3-SS-0.5	All VOC analytes	IS Recoveries Low	DCA / DFB / CBZ	J/UJ	I
SA-Q-3-WS-12	All VOC analytes	IS Recoveries Low	DFB / CBZ	J/R	I
SA-Q-2-SS-0.5RA	All VOC analytes	IS Recoveries Low	CBZ	J/UJ	I
AT-Q-27-SB-6'RA	All VOC analytes	IS Recoveries Low	CBZ	J/UJ	I
AT-Q-28-SB-6'-DUPRA	All VOC analytes	IS Recoveries Low	CBZ	J/UJ	I
SA-Q-3-SS-0.5RA	All VOC analytes	IS Recoveries Low	DFB / CBZ	. J/UJ	I
SA-Q-3-WS-12RA	All VOC analytes	IS Recoveries Low	DCA / DFB / CBZ	J/R	I
SA-Q-4-SB-6	All VOC analytes	IS Recoveries Low	DFB	J/UJ	I

DCA = 1,2-Dichloroethane-d4 DFB = 1,4-Difluorobenzene CBZ = Chlorobenzene-d5

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

· · · · · · · · · · · · · · · · · · ·		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			х

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	×		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Che aqueous sample, 90% for soil sample.)	ck QAPP or use 95% for	X		
14.2	Number of samples:	19			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	30			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	95.2			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

8/4/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.: Review Level: **SAS004** Level III

Major Anomalies:

Several samples were rejected due to holding times and surrogate recoveries.

Minor Anomalies:

Several samples were qualified due to surrogate, LCS, and internal standard recoveries.

Field IDs:

SA-Q-2-SS-0.5 SA-Q-2-SB-4 AT-Q-24-SB-6 AT-Q-24-SS-0.5 AT-Q-26-SB-6 AT-Q-26-SS-1.5' AT-Q-27-SB-6' AT-Q-27-SS-1' AT-Q-28-SB-6' AT-Q-28-SB-6'-DUP AT-Q-28-SS-1.5' SA-Q-3-SS-0.5 SA-Q-3-SB-6 SA-Q-3-SB-6-D SA-Q-3WS-12 SA-Q-4-SS-0.5 SA-Q-4-SB-6 AT-Q-29-SB-6'

AT-Q-28-WS-16'

1.0 Chain of Custody/Sample Condition

_			Yes	No	NA
	1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
		Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

Samples were reanalyzed outside of holding time.

The MS/MSD, LCS, internal standards, and surrogates had recoveries outside QC limits.

The method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10	þ		
	^o C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Tab for sample holding time.) If yes, J(+)/UJ(-).	e x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	х		

Note: All samples were re-extracted at least 25 days outside of holding time. The original analyses will be used.

Field ID	Analytes	Qualification	Code
SA-Q-2-SS-0.5RA	All SVOC analytes	R	Н
SA-Q-2-SB-4RA	All SVOC analytes	R	Н
AT-Q-26-SB-6RA	All SVOC analytes	R	• H
AT-Q-26-SS-1.5RA	All SVOC analytes	R	Н
AT-Q-27-SB-6RA	All SVOC analytes	R	Н
AT-Q-27-SS-1'RA	All SVOC analytes	. R	Н
AT-Q-28-SB-6'RA	All SVOC analytes	R	Н
AT-Q-28-SB-6'-DUPRA	All SVOC analytes	R	Н
AT-Q-28-SS-1.5'RA	All SVOC analytes	R	Н
SA-Q-3-SS-0,5RA	All SVOC analytes	R	Н
SA-Q-3-SB-6RA	All SVOC analytes	R	Н
SA-Q-3-SB-6RA2	All SVOC analytes	R	Н
SA-Q-3-SB-6-DRA	All SVOC analytes	R	Н
SA-Q-3-SB-6-DRA2	All SVOC analytes	R	Н
SA-Q-3-SB-6-DRA3	All SVOC analytes	R	Н
SA-Q-3-WS-12RA	All SVOC analytes	R	Н
SA-Q-4-SS-0.5RA	All SVOC analytes	R	Н
SA-Q-4-SB-6RA	All SVOC analytes	R	Н
AT-Q-29-SB-6'RA	All SVOC analytes	R	Н
AT-Q-28-WS-16'RA	All SVOC analytes	R	Н
AT-Q-28-WS-16'RA2	All SVOC analytes	R	Н

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	ж		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	х		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			х

Note: Diethyl phthalate had a positive result in the method blank. However, all associated samples were reported as non-detect; therefore no qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			Х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.		1-17-18-18-18-18-18-18-18-18-18-18-18-18-18-	х

Note:

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x	7	
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		х	
7.3	Are more than one of either fraction outside the acceptance criteria?	х	\$32	
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	х		
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			х
	Note: If SMC recoveries display unacceptable recoveries in the MS and/or diluted samples, then no reanalysis is required and ac and base/ neutrals are assessed separately.	ids		
	> UCL 10% to LCL < 10%			
	Positive J J J			
	Non-detect None UJ R	<u> </u>		

Note:

Several samples had surrogate recoveries below QC limits. The qualifications based on these recoveries are listed below. Information regarding the specific surrogate recoveries can be submitted upon request.

Field ID	Analyte	Qualification	Code
AT-Q-27-SB-6RE	All SVOCs	J/UJ	S
AT-Q-27-SS-1	All SVOCs	J/UJ	S
AT-Q-28-SB-6RE	All SVOCs	J/UJ	S
AT-Q-28-SB-6-DUPRE	All SVOCs	J/UJ	S
AT-Q-28-SS-1.5	All SVOCs	J/UJ	S
SA-Q-3-SB-6	All SVOCs	J/UJ	. S
SA-Q-3-SB-6-D	All SVOCs	J/UJ	S
SA-Q-3-WS-12RE	All SVOCs	J/UJ	S
SA-Q-4-SB-6	All SVOCs	J/UJ	S
AT-Q-29-SB-6	All detected SVOCs	J	S
AT-Q-28-WS-16	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteri and determine the need for qualification of the data for samples <i>from the same site/matrix</i> Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

Samples AT-Q-29-SB-6 and AT-Q-24-SB-6 were used as the MS/MSD. Several analytes were outside QC limits for the MS/MSD samples; qualifications are listed below.

Field ID	Analytes	MS/MSD Recoveries	RPD	Quals	Code
AT-Q-29-SB-6'	All SVOCs	All Below QC limits	All within QC limits	J/UJ	M
AT-Q-24-SB-6	All SVOCs	All Below QC limits	All within QC limits	J/UJ	М

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		х	
_	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td>res</td><td></td><td></td></lcl,>	res		
9.4	If Level IV, verify the % recoveries are calculated correctly.			х

Note: One LCS sample had several analytes outside QC limits; qualifications are listed below.

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10237/21-B	Acenaphthene	30	36-108
LCS 680-10237/21-B	Acenaphthylene	29	41-112
LCS 680-10237/21-B	Anthracene	31	46-115
LCS 680-10237/21-B	Benzo(a)anthracene	31	46-116
LCS 680-10237/21-B	Benzo(a)pyrnee	31	37-120
LCS 680-10237/21-B	Benzo(b)fluoranthene	30	35-122
LCS 680-10237/21-B	Benzo(g,h,i)perylene	29	41-122
LCS 680-10237/21-B	Benzo(k)fluoranthene	35	25-124
LCS 680-10237/21-B	Bis(2-chloroethoxy)methane	30	38-106
LCS 680-10237/21-B	Bis(2-chloroethyl)ether	25	30-98
LCS 680-10237/21-B	4-Bromophenyl phenyl ether	27	38-106
LCS 680-10237/21-B	Butyl benzyl phthalate	32	42-127
LCS 680-10237/21-B	Carbazole	30	47-118
LCS 680-10237/21-B	4-Chloro-3-methylphenol	28	39-113
LCS 680-10237/21-B	2Chloronaphthalene	28	41-110
LCS 680-10237/21-B	2-Chlorophenol	25	36-99
LCS 680-10237/21-B	4-Chlorophenyl phenyl ether	28	42-111
LCS 680-10237/21-B	Chrysene	34	46-118
LCS 680-10237/21-B	Dibenz(a,h)anthracene	30	41-124
LCS 680-10237/21-B	Dibenzofuran	29	44-108

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10237/21-B	1,3-Dichlorobenzene	23	34-90
LCS 680-10237/21-B	1,2-Dichlorobenzene	24	35-93
LCS 680-10237/21-B	1,4-Dichlorobenzene	24	32-90
LCS 680-10237/21-B	2,4-Dichlorophenol	28	43-108
LCS 680-10237/21-B	Diethyl phthalate	28	41-118
LCS 680-10237/21-B	2,4-Dimethylphenol	26	40-112
LCS 680-10237/21-B	Dimethyl phthalate	29	43-114
LCS 680-10237/21-B	Di-n-butyl phthalate	28	35-93
LCS 680-10237/21-B	2,6-Dinitrotoluene	32	38-128
LCS 680-10237/21-B	Di-n-octyl phthalate	28	43-129
LCS 680-10237/21-B	Fluoranthene	31	41-124
LCS 680-10237/21-B	Fluorene	29	37-113
LCS 680-10237/21-B	Hexachlorobenzene	32	46-115
LCS 680-10237/21-B	Hexachlorobutadiene	23	42-105
LCS 680-10237/21-B	Hexachlorocyclopentadiene	17	20-109
LCS 680-10237/21-B	Hexachloroethane	22	31-88
LCS 680-10237/21-B	Indeno [1,2,3-cd]pyrene	29	36-133
LCS 680-10237/21-B	Isophorone	27	37-106
LCS 680-10237/21-B	2-Methylnaphthalene	27	39-104
LCS 680-10237/21 - B	2-Methylphenol	26	38-107
LCS 680-10237/21-B	3 & 4 Methylphenol	29	37-106
LCS 680-10237/21-B	Naphthalene	26	34-97
LCS 680-10237/21-B	4-Nitroaniline	28	32-130
LCS 680-10237/21-B	2-Nitroaniline	24	38-124
LCS 680-10237/21-B	Nitrobenzene	21	33-106
LCS 680-10237/21-B	4-Nitrophenol	18	21-132
LCS 680-10237/21-B	2-Nitrophenol	24	38-104
LCS 680-10237/21-B	Pentachlorophenol	13	27-116
LCS 680-10237/21-B	Phenanthrene	31	47-114
LCS 680-10237/21-B	Phenol	27	34-98
LCS 680-10237/21-B	Pyrene	25	36-128
LCS 680-10237/21-B	1,2,4-Trichlorobenzene	14	36-98
LCS 680-10237/21-B	2,4,5-Trichlorobenzene	30	46-116
LCS 680-10237/21-B	2,4,6-Trichlorophenol	29	44-113

Field ID	Analytes	Qualification	Code
AT-Q-27-SB-6	All SVOCs	J/UJ	L
AT-Q-27-SS-1	All SVOCs	J/UJ	L
AT-Q-28-SB-6	All SVOCs	J/UJ	L
AT-Q-28-SB-6D	All SVOCs	J/UJ	L
AT-Q-28-SS-1.5	All SVOCs	J/UJ	L
SA-Q-3-SS-0.5	All SVOCs	J/UJ	L
SA-Q-3-SB-6	All SVOCs	J/UJ	L
SA-Q-3-SB-6-D	All SVOCs	J/UJ	L
SA-Q-3-WS-12	All SVOCs	J/UJ	L
SA-Q-4-SB-6	All SVOCs	J/UJ	L
AT-Q-29-SB-6	All SVOCs	J/UJ	L

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal stan	dard area of every sample a	and blank within upper and l	ower QC limits for each cont	inuing calibration?		х	
		Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				
Note:	calibration. Thu	cification is for the continui s, if all other QC specificati g individual samples in this	ions are met for a given sam	ed to the mid-point initial cali ple, using informed profession	ibration, not sample to con onal judgment, the reviewe	ntinuing er may		
10.2	Are retention tim	nes of internal standards wit	hin 30 seconds of the associ	ated calibration standard?		x		
			d to determine if any false po ion of the data for non-detec	sitives or negatives exist. For its in that sample/fraction.	shift of a large magnitude,	the		

Note: Certain internal standards were outside QC limits; qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-Q-3-SB-6-DRE	All detected SVOCs	J	I
SA-Q-2-SS-0.5RE	All detected SVOCs	J	· I
SA-Q-2-SB-4	All detected SVOCs	J	I
AT-Q-26-SB-6	All detected SVOCs	J	I .

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	х		
II .	Were all RPD or absolute difference values within the control limits?	х		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use	95% for aqueous sample, 90% for soil sample.)	х		
14.2	Number of samples:	19			<u> </u>
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	63			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	94.9			

DATA VALIDATION WORKSHEET PESTICIDES ANALYSIS

Reviewer:

Amelia Turnell

Project Name:

Sauget - Area 2

Date:

10/13/2005

Project Number:

Review Level:

21561511.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS003 Level III

Major Anomalies:

Some sample re-extractions were rejected due to holding times.

Minor Anomalies:

Samples were qualified based on holding times and surrogates.

Field IDs:

SA-Q-15-SS-0.5	
SA-O-15-SB-2	

SA-Q-13-SS-1

SA-Q-9-SS-0.5

SA-Q-13-SB-2 SA-Q-14-SS-0.5 SA-Q-13-SB-2

SA-Q-9-SB-5 SA-Q-9-SB-5-D

SA-Q-14-33-0.5 SA-Q-14-SB-5 SA-Q-11-SS-0.5 SA-Q-11-SB-2

SA-Q-10-SS-0.5

SA-O-10-SB-2

SA-Q-10-SS-0.5-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition			
1.3	of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated that samples were extracted out of hold time. Surrogates, LCS, MS/MSD were outside quality control limits. Several samples were diluted. Although it is beyond the scope of this review, it should be noted that CCVs for different clocks exceeded the %D for several compounds; thus the grand mean exception rule was applied to several samples.

2.0 Holding Time/ Preservation (Code H)

			Yes	No	NA
	2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
		If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler			, _ , , , , , , , , , , , , , , , , , ,
		was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
	2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	X		
1		Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
	2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

All samples were re-extracted outside hold time. Qualifications are listed below.

Field ID	Analytes	Qualification	Code
SA-Q-15-SS-0.5 RE	All Pesticides	· UJ/J	h
SA-Q-15-SB-2 RE	All Pesticides	UJ/J	h
SA-Q-14-SS-0.5 RE	All Pesticides	UJ/J	h
SA-Q-14-SB-5 RE	All Pesticides	UJ/J	h
SA-Q-13-SS-1 RE	All Pesticides	UJ	h
SA-Q-13-SB-2 RE	All Pesticides	UJ/J	h
SA-Q-11-SS-0.5 RE	All Pesticides	R	h
SA-Q-11-SB-2 RE	All Pesticides	R	h
SA-Q-9-SS-0.5 RE	All Pesticides	R	· h
SA-Q-9-SB-5 RE	All Pesticides	R	h
SA-Q-9-SB-5-D RE	All Pesticides	R	h
SA-Q-10-SS-0.5 RE	All Pesticides	R	h
SA-Q-10-SS-0.5-D RE	All Pesticides	R	h
SA-Q-10-SB-2 RE	All Pesticides	R	h

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results (TCL)?	*	X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			Х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			X
	If no, all standards, blanks, field samples and QC samples are rejected "R".	8638.48.30		

Note:

5.0 Initial Calibration (Code R)

	Yes	No	NA
Are Initial Calibration summary forms present and complete for each instrument used?			х
Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			Х
If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			
	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument? If not, $J(+)/UJ(-)$. In extreme cases, the reviewer may flag non-detects "R".	Are Initial Calibration summary forms present and complete for each instrument used? Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument? If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	Are Initial Calibration summary forms present and complete for each instrument used? Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument? If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".

6.0 Continuing Calibration (Code C)

			Yes	No	NA
6	5.1	Are Continuing Calibration Summary forms present and complete?			X
6	5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6	4 4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
		If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.		·	
6	5.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samp	les listed on the ap	propriate Surrogate Recovery	Summary Form?	x		
7.2	Are surrogate	e recoveries within	acceptance criteria specified in	n the QAPP for all samples?		х	
7.3	If No in Sect	ion 7.2, were these	e sample(s) or method blank(s)	reanalyzed?	x		
7.4	If No in Sect	ion 7.3, is any san	ple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)	x		
		> UCL	10% to LCL	< 10%			
	Positive	J	J .	J			
	Non-detect	None	UJ	R			

Note:

Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogates	Surrogate recoveries	Recovery limits
SA-Q-13-SS-1	Tetrachloro-m-xylene	26	30-150
SA-Q-13-SB-2	Tetrachloro-m-xylene	29	30-150
SA-Q-11-SB-2	Decachlorobiphenyl-13C12	479	30-150
SA-Q-11-SB-2 RE	Decachlorobiphenyl-13C12	282	30-150
SA-Q-9-SB-5	Tetrachloro-m-xylene	20	30-150
SA-Q-9-SB-5-D	Tetrachloro-m-xylene	16	30-150
SA-Q-10-SB-2	Decachlorobiphenyl-13C12	349	30-150
SA-Q-10-SB-2 DL	Decachlorobiphenyl-13C12	327	30-150
SA-Q-10-SB-2 RE	Decachlorobiphenyl-13C12	188	30-150

Field ID	Analytes Analytes	Qualification	Code
SA-Q-13-SS-1	All analytes	UJ/J	S
SA-Q-13-SB-2	All analytes	UJ/J	S
SA-Q-11-SB-2	Detected analytes	J	S
SA-Q-11-SB-2 RE	None	Already R due to hold time	S
SA-Q-9-SB-5	All analytes	UJ	S
SA-Q-9-SB-5-D	All analytes	UJ	S
SA-Q-10-SB-2	Detected analytes	J	S
SA-Q-10-SB-2 DL	Detected analytes	J	S
SA-Q-10-SB-2 RE	None	Already R due to hold time	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

Several recoveries and RDPs were out for the MS/MSD sample SA-Q-13-SS-1. No qualifiers were assigned.

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	Υ		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: $R>UCL$, $J(+)$ only; LCL , $J(+)/UJ(-)$; $<10\%$ $J(+)/R(-)$. RPD failures should be flagged "J" (+ only).			

Note:

The LCS had recoveries outside the QC limits.

Field ID	Analytes	LCS/LCSD/RPD Recoveries	LCS/LCSD/RPD Limits
LCSD 680-12974	Endosulfan I	1120/175	31-124/50
LCS/LCSD 680-12974	Endosulfan II	RPD 58	RPD Limit 50
LCS/LCSD 680-13400	Beta-BHC	RPD 99	RPD Limit 50

Endosulfan I, endosulfan II and beta-BHC were non-detect for related samples. Therefore, no qualifiers were assigned.

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			X
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			X
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	X		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.

13.0 Data Completeness

-			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP for soil sample.)	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)			
13.2	Number of samples:	14			
13.3	Number of target compounds in each analysis:	umber of target compounds in each analysis: 21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

8/5/2005

Project Number:

Review Level:

21561511.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS004 Level III

Major Anomalies:

Several samples were reanalyzed outside QC limits, qualifications are listed below.

Minor Anomalies:

Several analytes were qualified due to surrogate and LCS recoveries.

Field IDs:

SA-Q-2-SS-0.5SA-Q-2-SB-4AT-Q-24-SB-6AT-Q-24-SS-0.5AT-Q-26-SB-6AT-Q-26-SS-1.5'AT-Q-27-SB-6'AT-Q-27-SS-1'AT-Q-28-SB-6'AT-Q-28-SB-6'-DUPAT-Q-28-SS-1.5'SA-Q-3-SB-6SA-Q-3-SB-6-DSA-Q-3-WS-12SA-Q-4-SB-6

AT-Q-28-WS-16'

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		-
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the LCS, surrogate, MS/MSD, and internal standard recoveries were outside QC limits.

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

p=-		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the			
	cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Two samples that were reanalyzed exceeded the holding time criteria; qualifications are listed below.

Field ID	Analytes	Qualifications	Days late	Code
SA-Q-2-SB-4RA	All PCB analytes	R	35	Н
SA-Q-3-WS-12RA	All PCB analytes	R	34	Н

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		_
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			Х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			-

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?	M. S.		x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15 %)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			х

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sampl	es listed on the ap	propriate Surrogate Recovery S	ummary Form?	x		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples?		х	
7.3	If No in Secti	ion 7.2, were these	sample(s) or method blank(s) r	eanalyzed?	x		
7.4	If No in Sectiout.)	ion 7.3, is any sam	ple dilution factor greater than	10? (Surrogate recoveries may be	diluted		x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Sample ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-2-SB-4	Decachlorobiphenyl-13C12	24	30-130

Sample ID	Analytes	Qualification	Code
SA-Q-2-SB-4	All PCB analytes	UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

Sample AT-Q-29-SB-6 MS/MSD recoveries were outside QC limits. However, related LCS samples had recoveries within QC limits. No

qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.		_	x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

The LCS had recoveries outside the QC limits; qualifications are listed below.

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10400	Endosulfan II, Endrin ketone	22 / 42	31-127 / 47-156

Sample ID	Analytes	Qualification	Code
AT-Q-26-SS-1.5'	Endosulfan II, Endrin ketone	UJ	L
AT-Q-27-SB-6'	Endosulfan II, Endrin ketone	Πì	L
AT-Q-27-SS-1'	Endosulfan II, Endrin ketone	UJ	L
AT-Q-28-SB-6'	Endosulfan II, Endrin ketone	UJ	L
AT-Q-28-SB-6'-DUP	Endosulfan II, Endrin ketone	UJ	L
AT-Q-28-SS-1.5'	Endosulfan II, Endrin ketone	UJ	L
SA-Q-3-WS-12	Endosulfan II, Endrin ketone	UJ	L
SA-Q-4-SB-6	Endosulfan II, Endrin ketone	UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard			
10.1	RRT in the continuing calibration?			X

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			х
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			х

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	X		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

Note:

SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check sample, 90% for soil sample.)	QAPP or use 95% for aqueous	X		
13.2	Number of samples:	16			
13.3	Number of target compounds in each analysis:	21		-	
13.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
<u> </u>	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Laboratory

Date:

Bart Brandenburg

8/3/2005

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

AT-Q-24-SB-6 AT-Q-26-SS-1.5 AT-Q-28-SB-6'

SA-Q-3-SS-0.5 AT-Q-28-WS-16' AT-Q-29-SB-6'

SDG No.:

Review Level:

Sauget - Area 2

21561510.60010

SAS004 Level III

Major Anomalies:

Sample SA-Q-3-WS-12 was re-extracted outside of holding time limits, qualifications are listed below.

Minor Anomalies:

Samples were qualified based on MS/MSD, LCS, and surrogate recoveries.

Field IDs:

SA-Q-2-SS-0.5	SA-Q-2-SB-4	
AT-Q-24-SS-0.5	AT-Q-26-SB-6	
AT-Q-27-SB-6'	AT-Q-27-SS-1'	
AT-Q-28-SB-6'-DUP	AT-Q-28-SS-1.5	
SA-Q-3-SB-6	SA-Q-3-SB-6-D	
SA-Q-4-SS-0.5	SA-O-4-SB-6	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.2	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of			
1.3	samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the surrogates, LCS, and MS/MSD had recoveries outside the QC limits.

One sample was re-extracted outside holding time limits.

Although it is not part of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	х		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/ R(-).	x		

Note: Sample SA-Q-3-WS-12 was re-extracted 18 days outside of holding time limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-Q-3-WS-12 RE	All herbicide analytes	R	Н

3.0 Blanks (Method Blanks and Field Blanks)

(Code x - Field Blank Contamination, Code z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code r)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

5.0 Continuing Calibration (Code c)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 12 hours?	128)		х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			х

Note:

6.0 Surrogate Recovery (Code s)

					Yes	No	NA
6.1	Are all samples lis	sted on the app	propriate Surrogate Recovery S	ummary Form?	x		
6.2	Are surrogate reco	overies within	acceptance criteria specified in	the QAPP for all samples?		х	
6.3	If No in Section 6	.2, were these	sample(s) or method blank(s)	reanalyzed?	x		
6.4	If No in Section 6	.3, is any sam	ple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)			х
	>1	UCL	10% to LCL.	< 10%			
	Positive	J	J	J			
	Non-detect N	one	UJ	R			

Note: Sample SA-Q-3-WS-12 had surrogate recoveries outside QC limits. This sample was reanalyzed with similar surrogate results. Qualifications are listed below

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-3-WS-12	DCAA	22	34-127

Field ID	Analyte	Qualification	Code
SA-Q-3-WS-12	All herbicide analytes	UJ	S

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample AT-Q-29-SB-6 was used as the MS/MSD. Results were outside QC limits. Qualifications are listed below.

Field ID	Analytes	MS/MSD/RPD Recoveries	MS/MSD/RPD Limits
AT-Q-29-SB-6'	Pentachlorophenol	6/36 / 40	71-109 / 50

Field ID	Analyte	Qualification	Code
AT-Q-29-SB-6'	Pentachlorophenol	J	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code I - LCS recovery Code e - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	Х		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td>_</td><td></td></lcl,>		_	

Note: LCS results were outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS/LCSD/RPD Recoveries	LCS/LCSD/RPD Limits
LCS 680-10240	Pentachlorophenol	97/178 / 59	71-109 / 50

Field ID	Analyte	Qualification	Code
AT-Q-29-SB-6'*	Pentachlorophenol	Ј	L
SA-Q-4-SS-0.5	Pentachlorophenol	J	L
SA-Q-4-SB-6	Pentachlorophenol	J	· L
AT-Q-28-WS-16'	Pentachlorophenol	Ј	L

9.0 TCL Identification (Code w)

 		Yes	No	NA
0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
9.1	continuing calibration?			X

Note:

10.0 TCL Quantitation and Reported Detection limits (Code p)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		7.2	х
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

11.0 Field Duplicate Samples (Code f)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	X		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or a soil sample.)	use 95% for aqueous sample, 90% for	x		
12.2	Number of samples:	19			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2	
Date:	8/4/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS004	
		Review Level:	Level III	
Major Anomal	ies:			
	No samples were rejected.			
Minor Anomal	ies:			
	Samples were qualified based on MS/MSD recoveries, method blank con	ntamination, and laboratory duplicate RPD	S.	
Field IDs:	SA-Q-2-SS-0.5	SA-Q-2-SB-4	AT-Q-24-SB-6	
	AT-Q-24-SS-0.5	AT-Q-26-SB-6	AT-Q-26-SS-1.5'	
	AT-Q-27-SB-6'	AT-Q-27-SS-1'	AT-Q-28-SB-6'	
	AT-Q-28-SB-6'-DUP	AT-Q-28-SS-1.5'	SA-Q-3-SS-0.5	
	SA-Q-3-SB-6	SA-Q-3-SB-6-D	SA-Q-3-WS-12	
	SA-Q-4-SS-0.5	SA-Q-4-SB-6	T-Q-29-SB-6'	
	AT-Q-28-WS-16'			

1.0 Chain of Cu	stody/Sample Condition/Raw Data		ICP		I	CP-M	IS		GFA.	4	C\	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X									X		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?										x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	X									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									X		

Note: The laboratory case narrative indicated that the serial dilution sample and the MS/MSD were outside the QC limits.

:	2.0 Holding Tim	e (Code H)		ICP		I	CP-M	IS		GFA.	4	C	VAA-	Hg
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
I		Have any technical holding times, determined from date of collection to date of												
	2.1	analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding	,	x			24-16-2 24-16-2						х	
I		Time Table.	<u> </u>				1,100							
ı		Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time												
I		criteria) J(+)/R(-).												į

Note:

3.0 Instr	rument	Calibration (Code C)						ICP		I	CP-M	IS	1	GFA.	4	C	VAA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.	3.1	Are sufficient standards inc standard; GFAA: blank + tl			`	olank + one			х									
3.	3.2	Are the correlation coeffici	ents > 0.995	? (for GFAA and	CVAA) Action:	J(+)/UJ(-).												х
3.	3.3	Was an initial calibration analysis? Action: If no, u and note in reviewer narrat	ise professio						х									х
3.	3.4	Was continuing calibration hours, whichever is more determine affect on the data	frequent?	Action: If no, us	e professional ji	-	1,000,000		х									х
3.	3.5	Are all calibration standar limits? Mercury (80%-120	-	,	,	the control			х									х
		Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)										X.511		
		Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
L		Other Metals	< 75%	75% - 89%	111% - 125%	> 125%												

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

	•		ICP		I	CP-M	1S		GFA.	1	CV	AA-	Hg
 		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									X		
	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										Х	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
 4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										X	
	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									х	
 4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									х	-

Several target analyte values were detected above the IDL; however, most of the sample values were greater than 5 times the blank results. Those that were not are qualified below.

Sample ID	Analyte	Qualification	Code	New RL
AT-Q-24-SS-0.5	Sodium	U	P	260
AT-Q-28-SS-1.5'	Sodium	U	P	200
SA-Q-4-SS-0.5	Sodium	^ U	P	120

ICP Interf	erence Check Sample (ICS) (Code N)		ICP		ICP-MS	GFAA	CVAA-Hg
		Yes	No N	A Yes	No NA	A Yes No NA	Yes No NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?			۲		x	
5.2	Are the ICS AB recoveries within 80% - 120%?					х	
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?		,			x	
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?		,			x	
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)						
	UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)						

Note:

_aborator	aboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)		ICP			I	CP-M	1S		GFA.	1	CV	/AA-l	Hg
				No	NA	Yes	No	NA	Yes	No	NA	Yes	No	N/
	Was an LCS prepared and analyzed at the correct frequency (one per 20 sa	mples, per												
6.1	batch, per matrix and per level)? Action: If no, J(+) any sample not asso LCS results.											X		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% except Ag and Sb; Solid limits: as per EPA-EMSL/LV)	- 120% -		X									х	
	Action: Solid Aqueous									52(G)				
	< LCL > UCL < 50% 50% - 79% > 120%									1. 1. julija				
	J(+)/UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)													

Note:

0 Laboratory	Duplicates (Code K)		ICP		I	CP-M	S		GFA.	A	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per												
7.1	20 samples, per batch, per matrix and per level)? Action: If no, J(+), with	X									х	ı	
	professional judgment, analytes not associated with Duplicate results.											. 1	
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with					200							
7.2	professional judgment. Note in worksheet.		36. X (0)	1								Х	
	Are all analyte duplicate results within control? (RPD values < 20% or difference < ±			1				Y-100					
7.3	PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids) Action. If		х	1								x	
	no, J(+).			1									
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample AT-Q-29-SB-6 was analyzed in duplicate by the lab. Sample RPD values for laboratory duplicate samples were outside QC limits; qualifications are listed below.

Sample ID	Analyte	Qualification	Code
AT-Q-29-SB-6'	Mercury	J	K

8.0 Spike Sample Analysis - Pre-Digestion (Code M - Recovery, Code D - RPD) ICP ICP-MS GFAA CVAA-Hg Yes No NA Yes No NA Yes No NA Yes No NA Was a spiked sample prepared and analyzed at the correct frequency (one per 20) 8.1 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional x judgment, analytes not associated with matrix spike results. Was a field blank used for the MS analysis? Action: If yes, J(+) with professional 8.2 x judgment. Note in worksheet. Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG. For all analytes with sample concentration < 4 x spike concentration, are spike 8.3 recoveries within the control limit of 75-125%? (No control limit applies to analytes x with concentration > 4 x spike concentration.) %R > 125%30% < %R < 74% %R < 30% Positive J J J Non-detect None UJ R

Note: Sample AT-Q-26-SB-6 was spiked and analyzed for Mercury with recoveries outside QC limits; qualifications are listed below.

Field ID	Analyte	Recovery	Criteria
AT-Q-29-SB-6	Antimony	46/50	75-125
AT-Q-29-SB-6	Copper	100/22	75-125
AT-Q-29-SB-6	Lead	38/80	75-125
AT-Q-29-SB-6	Potassium	163/143	75-125
AT-Q-26-SB-6	Mercury	108/172	75-125

Qualifications based on MS/MSD recoveries are listed below.

Field ID	Analyte	Qualification	Code
AT-Q-29-SB-6	Antimony	J	M
AT-Q-29-SB-6	Copper	J	М
AT-Q-29-SB-6	Lead	J	M
AT-Q-29-SB-6	Potassium	J	M
AT-Q-26-SB-6	Mercury	J	M

9.0 Instrument Detection Limits (IDL)			ICP		ICP-MS			GFAA		A	CVAA-Hg		Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			X				200					x

Note:

10.0 ICP Serial Dilutions (Code S)		ICP		ICP-MS		S	GFAA			CVAA-Hg		Hg	
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	X			100								
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration $> 50 x$ the IDL in the original sample? If no, J(+).	X											

Note: Samples SA-Q-2-SS-0.5, AT-Q-29-SB-6, and AT-Q-28-WS-16 were diluted and reanalyzed by the lab.

11.0 Field Duplicate Samples (Code F)		ICP			ICP-MS			GFAA			CVAA-Hg		Hg	
_			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	11.1	Were any field duplicates submitted for metal analysis?	x			2 999						X		
	11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference $< \pm 2$ x PQL and for solids, RPD $< 100\%$ or difference $< \pm 4$ x PQL)			:							x		

Samples AT-Q-28-SB-6 and AT-Q-28-SB-6-DUP are a parent/duplicate pair.

Samples SA-Q-3-SB-6 and SA-Q-3-SB-6-D are a parent/duplicate pair.

12.0 Result Verification (Code Q) ICP-MS		GFAA			CVAA-Hg		Hg						
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									х
12.2	Were all dilution reflected in the positive results and detection limits?			х									х

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)			•			
13.2	Number of samples:	19		0		0	19
13.3	Number of target compounds in each analysis:	22		22		0	1
13.4	Number of results rejected and not reported:	0		0		0	0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)						
	% Completeness	100.	#:	###	#	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

8/3/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS004

Test Name:

Ammonia

Review Level:

Level III

Method No.:

350.1

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples were qualified in this SDG.

AT-Q-28-WS-16'

Field IDs:

SA-Q-2-SS-0.5	SA-Q-2-SB-4	AT-Q-24-SB-6
AT-Q-24-SS-0.5	AT-Q-26-SB-6	AT-Q-26-SS-1.5
AT-Q-27-SB-6'	AT-Q-27-SS-1'	AT-Q-28-SB-6'
AT-Q-28-SB-6'-DUP	AT-Q-28-SS-1.5	SA-Q-3-SS-0.5
SA-Q-3-SB-6	SA-Q-3-SB-6-D	SA-Q-3-WS-12
SA-Q-4-SS-0.5	SA-Q-4-SB-6	AT-Q-29-SB-6'

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		_
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

2.0 Holding T	ime/ Preservation (Code H)	Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
	Time Table for sample holding time.) If yes, J(+)/UJ(-).		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		х	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	#8% [25] (8) (8) (8) (8) (8) (8) (8) (8) (8) (8)		
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?		-	х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag F			
5.4	If Level IV, calculate a sample of %Rs.			x

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X	-	
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		Х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample AT-Q-29-SB-6 was analyzed as the MS/MSD. Sample concentrations were greater than 4X the spike concentrations; therefore no qualification of data was required.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

8.0 Analyte Identification

		Yes	No	NA
0 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in			
8.1	the continuing calibration?			x

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?		-	х
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	2000-1000000000000000000000000000000000		х
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			х

Note:

10.0 Field Duplicate Samples (Code F)

			Yes	No	NA
L	10.1	Were any field duplicates submitted?	х		
	10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
		Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

SA-Q-3-SB-6 and AT-Q-28-SB-6' were the parent samples of SA-Q-3-SB-6-D and AT-Q-28-SB-6'-DUP.

11.0 Laboratory Duplicates (Code K)

·		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, $J(+)$, with professional judgment, analytes not associated with duplicate results.		х	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or sample.)	use 95% for aqueous sample, 90% for soil	X		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$		†		
	% Completeness	100			

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

7/15/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.: Review Level: SAS 005 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No analytes required qualification based on this data review.

Field IDs:

AA-SLAY-3-90

AA-SLAY-3-110

AA-SLAY-3-122

AA-SLAY-2-42

TB-6

AA-SLAY-2-62

AA-SLAY-2-82

AA-SLAY-2-102

AA-SLAY-2-102-D

AA-SLAY-2-122

AA-SLAY-4-46

AA-SLAY-4-66

AA-SLAY-4-86

AA-SLAY-4-106

AA-SLAY-4-126

TB-7

Trip Blank

SA-P-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The case narrative indicated that the MS/MSD sample had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservat	tion, collection and stor	rage condition meet m	ethod requirements?	x		
	unpreserved or temp	perature is outside the r	ange 0° (but not frozen	, <2° >6°C, etc.), comment in repo n) to 10° flag all positive results we detections "J" and non-detects "	rith a "J		
2.2	Have any technical l J(+)/UJ(-).	holding times, determin	ned from sampling to o	late of analysis, been exceeded? In	fyes,	X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 °C ± 2 °C	14 days	14 days			
2.3	Have any technical l	holding times been gro	ssly (twice the holding	time) exceeded? If yes, J(+)/R(-)		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			х
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

<u> </u>		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	х		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.	·		
4.4	If Level IV, review raw data and verify all detections for blanks were reported.		<u> </u>	x

Note:

Toluene was detected in the field blank above the MDL; however, all associated samples were non-detect for toluene. No qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		1	
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 fo poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.	•		x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			х

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sampl	es listed on the app	propriate Surrogate Recovery S	ummary Form?	x		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples?	x		
7.3			sample(s) or method blank(s) r				х
7.4	out.) Note: If SMO		t meet acceptance criteria in san	10? (Surrogate recoveries may be diluted inples chosen for the MS/MSD or diluted			х
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
_	Non-detect	None	UJ	R			

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		-
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		Х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			·

Note:

The MS/MSD sample had recoveries outside the QC limits for benzene; however, the LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal stan	dard areas for every sample	and blank within upper and	d lower QC limits?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			-
	Non-detect	None	UJ	R			
Note:	calibration, not s		tion. Thus, if all other QC:	d to the mid-point initial specifications are met for a ge not to flag individual samp			,
10.2		nes of internal standards with			x		
		nagnitude, the reviewer may		positives or negatives exist. ection of the data for non-det	For		

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT	5,000		
11.1	in the continuing calibration?			• ж
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample			
11.2	mass spectrum; and do sample and standard relative ion intensities agree within 30%?			X

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

<u></u>		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	X		-
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		x.		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.2 * 14.3) - 14.4) / (14.2 * 14.3)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

7/15/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.: Review Level: SAS 005 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

AA-SLAY-3-90

AA-SLAY-3-110

AA-SLAY-3-122

AA-SLAY-2-42

AA-SLAY-2-62

AA-SLAY-2-82

AA-SLAY-2-102

AA-SLAY-2-102-D

AA-SLAY-2-122

AA-SLAY-4-46

AA-SLAY-4-66

AA-SLAY-4-86

AA-SLAY-4-106

AA-SLAY-4-126

SA-P-1-FB

1.0 Chain of Custody/Sample Condition

_			Yes	No	NA
	1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
Г	1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of	¥		
L		samples, analytical problems or special circumstances affecting the quality of the data?	^		

Note:

The MS/MSD and LCS had recoveries outside OC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached			
2.2	Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	X		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	х	7.5	

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	X		
3.2	Have all samples been analyzed within twelve hours of the tune?	X (200)		
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?	X	<u> </u>	
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

			Yes	No	NA
4.	Is a Method Blank Summary form present for each batch?	Š	х		
4.	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?			X	
4.	Do any field equipment blanks have positive results (TCL, and/or TIC)?			X	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration shou "U" and the detection limit elevated to the RL for estimate concentrations.	ld be qualified			
4.	If Level IV, review raw data and verify all detections for blanks were reported.				Х

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA.
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		100	x
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	7		x

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only, a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

						Yes	No	NA NA
7.1	Are all samp	Are all samples listed on the appropriate Surrogate Recovery Summary Form?				x		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples ar	nd method blanks?	x		
7.3	Are more tha	Are more than one of either fraction outside the acceptance criteria?				x		
7.4	If Yes in Sect	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?						х
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?			• •			x	
	Note: If SMC recoveries display unacceptable recoveries in the MS and/or diluted samples, then no reanalysis is required and acids and base/neutrals are assessed separately.							
		> UCL	10% to LCL	< 10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?	- ET 10	х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: The MS/MSD sample recovered certain analytes outside QC limits. However the LCS was within QC limits for those analytes; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA.
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		х	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(0.00000000000000000000000000000000000<="" td="" uj(-);=""><td>_</td><td></td><td></td></lcl,>	_		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note: The LCS had %RPD values for hexachlorocyclopentadiene outside QC limits. However data is not qualified based on %RPD alone; therefore no qualification of data was required.

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal stan calibration?	dard area of every sample a	nd blank within upper and lo	ower QC limits for each continu	iing	X		
		Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				
Note:	sample to contin		other QC specifications are	d to the mid-point initial calibra e met for a given sample, using amples in this case.				
10.2	Are retention tim	nes of internal standards with	nin 30 seconds of the associa	ated calibration standard?		x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			r shift of a				

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			X
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or us soil sample.)	e 95% for aqueous sample, 90% for	X		
14.2	Number of samples:	15			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.2 \times 14.3) - 14.4) / (14.2 \times 14.3)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

7/15/2005

Project Number:

21561511.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.: Review Level: SAS 005 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs:

SA-P-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	х		

Note:

The laboratory case narrative indicated that the LCS recovery was outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Tim Table for sample holding time.) If yes, J(+)/UJ(-).	e	X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		x	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		X	
_	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RI for estimate (laboratory "J" flagged) concentrations.	,		
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?	W 885/4		х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?	Y. 1	-	х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?		4	х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

	Yes	No	NA
Are Continuing Calibration Summary forms present and complete?	- 1112		х
Has a continuing calibration standard been analyzed every 12 hours?			х
Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			х
If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/UJ(-). For %D > 50%, flag R.			
If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			x
	Has a continuing calibration standard been analyzed every 12 hours? Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)? If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.	Are Continuing Calibration Summary forms present and complete? Has a continuing calibration standard been analyzed every 12 hours? Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)? If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.	Are Continuing Calibration Summary forms present and complete? Has a continuing calibration standard been analyzed every 12 hours? Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)? If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.

7.0 Surrogate Recovery (Code S)

			·	Yes	No	NA.
7.1	Are all samples listed on the ap	propriate Surrogate Recovery	Summary Form?	x		
7.2	Are surrogate recoveries within	acceptance criteria specified	in the QAPP for all samples?	x		
7.3	If No in Section 7.2, were these	sample(s) or method blank(s)	reanalyzed?		,	х
7.4	If No in Section 7.3, is any sam	ple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)			х
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	· UJ	R	-	-	

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.	-25		x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS had recoveries outside the QC limits. However, the LCS is associated with the field blank; therefore no qualification of data was required.

10.0 TCL Identification (Code W)

Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			Yes	No	NA
calibration?	10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
	10.1	calibration?			X

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			х
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		х	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or a sample.)	use 95% for aqueous sample, 90% for soil	X		
13.2	Number of samples:	1			
13.3	Number of target compounds in each analysis:	31			
13.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100	++		

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

7/15/2005

Project Number: SDG No.:

21561510.60010

Laboratory

Severn Trent Laboratory - Savannah

Review Level:

SAS 005 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AA-SLAY-3-90

AA-SLAY-2-42

AA-SLAY-2-102

AA-SLAY-4-46 AA-SLAY-4-106 AA-SLAY-3-110 AA-SLAY-2-62

AA-SLAY-2-102-D

AA-SLAY-4-66 AA-SLAY-4-126 AA-SLAY-3-122

AA-SLAY-2-82 AA-SLAY-2-122

AA-SLAY-4-86 SA-P-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the CCV had recoveries outside QC limits. This is beyond the scope of this review, although it should be noted.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	,	X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	•

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

			Yes	No	NA
	3.1	Is a Method Blank Summary form present for each batch?	X		
	3.2	Do any method blanks have positive results?		Х	
Г	3.3	Do any field/rinse/equipment blanks have positive results?		Х	
		Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RI	,		
L		for estimate (laboratory "J" flagged) concentrations.			
L	3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			х

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			<u>x</u>
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the appropriat	e Surrogate Recovery	Summary Form?	Х		
6.2	Are surrogate recoveries within accepta	nce criteria specified	in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were these sample	(s) or method blank(s)) reanalyzed?			x
6.4	If No in Section 6.3, is any sample dilu	ion factor greater that	n 10? (Surrogate recoveries may be diluted out.)			X
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
<u> </u>	Non-detect None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x	_	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).		···	-

Note: The MS/MSD had recoveries outside QC limits; however the LCS was within QC limits. No qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA .
8.1	Is an LCS recovery form present?	х		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	х		-
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td>,</td><td></td></lcl,>		,	

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			i
9.1	calibration?			X
				الــــــــــــــــــــــــــــــــــــ

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			Х
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			Х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			х

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	Х		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for so	oil		
12.1	sample.)	X		
12.2	Number of samples: 15			
12.3	Number of target compounds in each analysis: 10			
12.4	Number of results rejected and not reported: 0			
	% Completeness = 100 x ((12.2 x 12.3) - 12.4) / (12.2 x 12.3)			
	% Completeness 100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2	
Date:	7/15/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS005	
		Review Level:	Level III	

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries and Laboratory duplicate %RPD.

Field IDs:	AA-SLAY-3-90	AA-SLAY-3-110	AA-SLAY-3-122
	AA-SLAY-2-42	AA-SLAY-2-62	AA-SLAY-2-82
	AA-SLAY-2-102	AA-SLAY-2-102-D	AA-SLAY-2-122
	AA-SLAY-4-46	AA-SLAY-4-66	AA-SLAY-4-86
	AA-SLAY-4-106	AA-SLAY-4-126	SA-P-1-FB

1.0 Chain of Custody/Sample Condition/Raw Data

			ICP		I.	CP-M	1S		GFA.	4	CV	VAA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	х									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									X		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?											x	
1.4	Does sample preservation, collection and storage meet method requirements? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C + 2^{\circ}C$)	x									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	X									Х		
Note:	The laboratory case narrative indicated that the MS/MSD had recoveries outside the OC limits.		<u> </u>			<u> </u>		000			OMMONO.II		

The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the serial dilution %RPDs exceeded control limits.

2.0 Holding Time (Code H)

			ICP		I	CP-M	1S		GFA	4	C	/AA-I	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		X									X	
 	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.												

Note:

3.0 Instrument Calibration (Code C)

						L	ICP		I	CP-M	1S		GFA.	4	CV	AA-I	Hg
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand	cluded in the ards; CVAA	e calibration curve : blank + five stan	e? (ICP/ICP-MS: ladards)	olank + one standard	;		х							is a		
3.2	Are the correlation coeffici	ents \geq 0.995	? (for GFAA and	CVAA) Action: J((+)/UJ(-).												x
3.3	Was an initial calibration v If no, use professional judg	erification (I	ICV) analyzed at termine affect on the	the beginning of ea	ich analysis? Action reviewer narrative.	:		х									x
3.4	Was continuing calibration whichever is more frequent the data and note in review	nt? Action:						x									x
3.5	Are all calibration standa Mercury (80%-120%) and			and CCV) within	the control limits			х			-						х
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)												
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%				90 A.M.								

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

				ICP		I	CP-M	IS	(GFA.	١.	CV	AA-I	Hg
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4	4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									X		
4	4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	Х										x	
4	4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									х		
	1.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										X		
4	4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										X	
4	4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		X									X	
2	4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action: If ves, J(+)/UJ(-),		x									X	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

					•			ICP		I	CP-M	IS		GFA.	4	C١	/AA-	Hg
	. <u></u> .						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1					at least twice ever uent) for ICP-MS?	ry 8 hours), and at 1	he		х									
5.2	Are the ICS	S AB recoveri	es within 80% -	120%?					х									
5.3	Are the res	ults for unspil	ced analytes (in I	CS A) < + IDL?				х							-			
5.4	If not, are ICS?	the associated	d sample Al, Ca	, Fe, and Mg c	oncentrations less	than the level in t	he		х									
	Action:	Not Spik	ed Analytes	Spiked	d analytes (ICS AF	3 analytes)												
		<-IDL	> IDL	< 50%	50% - 79%	> 120%						·						
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)								 				

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

								ICP		IC	P-M	ſS		GFA.	4	CVA	A-Hg
								No	NA	Yes	No	NA	Yes	No	NA	Yes N	o NA
6.1	Was an LC: matrix and	S prepared and per level)? Ac	l analyzed at the tion: If no, J(-	he correct frequ +) any sample n	ency (one per 20 ot associated with	samples, per batch, per LCS results.	x									x	
6.2	Is any LCS		ide the control	limits? (Aque		120% - except Ag and		х								x	
	Action:	So	olid		Aqueous												
		< LCL	> UCL	< 50%	50% - 79%	> 120%											
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)											

Note:

7.0 Laboratory Duplicates (Code K)

			ICP		IC	CP-M	IS		GFA.	4	CV	'AA-I	Hg
 		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,												
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes	x									x		
	not associated with Duplicate results.												
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional					W /35							
	judgment. Note in worksheet.		x									Х	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference $< \pm$ PQL for											2,2812,251	
7.5	aqueous, and RPD < 35% or difference $< \pm 2$ X PQL for solids) Action: If no, J(\pm).		X								X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample AA-SLAY-2-82 was run in duplicate. When compared, the %RPDs for aluminum were outside QC limits. Qualification is listed below.

Field ID	Analyte	Qualification	Code
AA-SLAY-2-82	Aluminum	J	K

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

				·		ICP		I	CP-M	IS		GFA.	4	CV	'AA-1	Hg
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
				equency (one per 20 samples, pe					-		F 140.98					_
8.1		trix and per level)? h matrix spike results		rofessional judgment, analytes no	t x									X		
8.2	Was a field b Note in works		S analysis? Action: If yes	, J(+) with professional judgment		x			- 11						Х	
	Note: Matrix sample in an S	·	be performed on a field b	lank when it is the only aqueou	5											
8.3		nit of 75-125%? (N		ration, are spike recoveries within analytes with concentration > 4		х								x		
		%R > 125%	30% < %R < 74%	%R < 30%												
	Positive	J	J	J	3.55											
	Non-detect	None	UJ	R	0.888											-

Note: The MS/MSD was above QC limits for potassium; qualification is listed below.

Field ID	Analyte	Qualification	Code
AA-SLAY-2-82	Potassium	J	M

9.0 Instrument Detection Limits (IDL)

		ICP		I	CP-M	IS	1	GFA.	4	C/	AA-I	-Ig
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1 Are all IDL equal to or less than the reporting limits specified?			х									x

10.0 ICP Serial Dilutions (Code S)

				ICP		I	CP-M	1S		GFA.	4	C	/AA-	Hg
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	10.1	Were serial dilutions performed?	X											
L	10.2	Was a five-fold dilution performed?	x											
	10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note:

11.0 Field Duplicate Samples (Code F)

			ICP		I	CP-M	1S	(GFA.	4	CV	/AA-l	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	x									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < ± 4 x PQL)	X									X		

Note: Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

12.0 Result Verification (Code Q)

12.0	itesuit vei	meanon (Code Q)		ICP		11	CP-IV	12		JFAA	4	L CV	AA-I	Hg ∥
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									х
	12.2	Were all dilution reflected in the positive results and detection limits?			х									х

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)			· ·		
13.2	Number of samples:	15		0	0	 15
13.3	Number of target compounds in each analysis:	22] [0	0	1
13.4	Number of results rejected and not reported:	0		. 0	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$					$\vdash \vdash$
	% Completeness	100		####	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Bart Brandenburg

Date:

7/15/2005

Laboratory

Severn Trent Laboratory - Savannah

Test Name:

Ammonia

Method No.:

350.1

Project Name:

Sauget - Area 2

Project Number:

21561510.60011

SDG No.:

SAS 005

Review Level:

Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on field blank contamination and MS/MSD recoveries outside QC limits.

Field IDs:

AA-SLAY-3-90

AA-SLAY-3-110

AA-SLAY-3-122

AA-SLAY-2-42

AA-SLAY-2-62

AA-SLAY-2-82

AA-SLAY-2-102 AA-SLAY-4-46 AA-SLAY-2-102-D AA-SLAY-4-66 AA-SLAY-2-122 AA-SLAY-4-86

AA-SLAY-4-106

AA-SLAY-4-126

SA-P-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		-
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		•	

Note:

No anomalies were noted on the laboratory case narrative.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the			
	temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all			
	non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been			
2.2	exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		X	
2.2	Have any technical holding times grossly (twice the holding time) been exceeded? If yes,			
2.3	J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

_			Yes	No	NA
	3.1	Is a Method Blank Summary form present for each batch?	X		
	3.2	Do any method blanks have positive results?		X	· · · · · · · ·
	3.3	Do any field/rinse/equipment blanks have positive results?	х		
		Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
L	3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: The Field Blank sample had a detection above the MDL; the following qualifications were made.

Field ID	Analyte	Qualification	Code
AA-SLAY-2-42	Ammonia	U	X
AA-SLAY-2-62	Ammonia	U	X
AA-SLAY-4-46	Ammonia	U	X

4.0 Initial Calibration (Code C)

		Yes	No	NA_
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	To a comment of the c		
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			Х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For $R < 50\%$, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			х

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	¥		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: The MS/MSD sample had recoveries outside the QC limits; the parent sample is qualified below.

Field ID	Analyte	MS/MSD Recovery	RPD	MS/MSD/RPD Limits	Qualification	Code
AA-SLAY-2-82	Ammonia	34/38	4	90-110/30	Ј	М

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			X
	Action for specific compound outside the acceptance criteria: $R>UCL$, $J(+)$ only; LCL , $J(+)/UJ(-)$; $<10\%$ $J(+)/R(-)$. RPD failures should be flagged "J" (+ only).			

Note:

8.0 Analyte Identification

		Yes	No	NA
0 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RR	Γ		7
0.1	units of the standard RRT in the continuing calibration?			х

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x	.	
	Action for specific compound outside the acceptance criteria: $R>50$ (water), $R>100$ (soil). $J(+)$ only.			

Note: Sample AA-SLAY-2-102 is the parent sample of AA-SLAY-2-102-D.

11.0 Laboratory Duplicates (Code K)

P=-		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	The X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		×	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	X		

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		X		
12.2	Number of samples:	15	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
12.3	Number of target compounds in each analysis:	1		·	1
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.2 \times 12.3) - 12.4) / (12.2 \times 12.3)$				ĺ
·	% Completeness	100			

DATA VALIDATION WORKSHEET **VOLATILE ORGANIC ANALYSIS**

Reviewer:

Date:

Bart Brandenburg

8/17/2005

Laboratory Severn Trent Laboratory - Savannah **Project Name:**

Sauget - Area 2 21561510.60011

Project Number:

SDG No.:

SAS 006

Review Level:

Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on internal standards and surrogate recoveries.

Field IDs:

SA-O-1-SS-0.5	SA-O-1-SS-0.5-D
SA-O-3-SS-0.5	SA-O-3-SB-4
SA-O-4-SS-0.5	SA-O-4-SB-6
SA-O-2-SB-5	SA-O-2-WS-9
AT-Q-25-WS-9	SA-P-1-SS-0.5
SA-P-1-SB-6	SA-P-1-WS-8

SA-O-1-SB-3

SA-O-3-WS-9 SA-O-2-SS-0.5

SA-O-2-WS-9-D

SA-P-1-SS-0.5-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		`
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x	e i pa	

Note:

The laboratory case narrative indicated that the surrogate, LCS, and MS/MSD recoveries were outside QC limits.

Although it is beyond the scope of this review, it should be noted that the CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	ŅA
2.1	Do sample preservati	ion, collection and stor	age condition meet me	ethod requirements?	X		•
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical h	olding times, determin	ned from sampling to d	ate of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 °C ± 2 °C	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).				x		

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	<u> </u>		х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			х
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			х

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks) (Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X	_	
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	118 99	x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?	4.00		х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			х

Note:

6.0 Continuing Calibration (Code C)

·		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	,		x
	If yes, a marginal increase in response \geq 20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D \geq 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.		* \$1,300	x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sample	les listed on the ap	propriate Surrogate Recovery Su	ummary Form?	X		
7.2	Are surrogate	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?					
7.3	If No in Sect	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					
7.4	If No in Sect	ion 7.3, is any sam	ple dilution factor greater than 1	0? (Surrogate recoveries may be diluted out.)			х
	Note: If SMe reanalysis is		t meet acceptance criteria in sam	nples chosen for the MS/MSD or diluted samples, then no			
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note: Two samples had surrogate recoveries outside QC limits; qualifications are listed below.

Field ID	Surrogate	Surrogate recovery	Surrogate limits
AT-Q-25-WS-9	4-Bromofluorobenzene	61	68-121
AT-Q-25-WS-9	Toluene-d8	60	65-128
AT-Q-25-WS-9RA	4-Bromofluorobenzene	62	68-121
AT-Q-25-WS-9RA	Toluene-d8	52	65-128

Field ID	Analyte	Qualification	Code
AT-Q-25-WS-9	All VOCs	J/UJ	S
AT-Q-25-WS-9RA	All VOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).	, , , , , , , , , , , , , , , , , , , ,		

Note: Sample SA-O-3-SS-0.5 was used as the MS/MSD. Several MS/MSD recoveries were outside QC limits, however the LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		-
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
9.4	If Level IV, verify the % recoveries are calculated correctly.			х
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).="" rpd<="" td="" uj(-);=""><td></td><td></td><td>,</td></lcl,>			,
	failures should be flagged "J" (+ only).			

Note: Several LCS recoveries were outside QC limits, however they were all associated with method blank samples only. No qualification of data was required.

10.0 Internal Standards (Code I)

					Yes	İ	No	NA
10.1	Are internal stan	dard areas for every sample	and blank within upper and	lower QC limits?			х	
		Area > +100%	Area < -50%	Area < -10%			,	
	Positive	J	J	J				
	Non-detect	None	UJ	R				
Note:	continuing calib		specifications are met for a	d to the mid-point initial calibration given sample, using informed pro				
10.2		nes of internal standards with		ated calibration standard?	X	6145 18415		
				positives or negatives exist. For shetects in that sample/fraction.	1.0000000000000000000000000000000000000	*****		

Note: Internal standards were outside QC limits for one sample. Qualifications are listed below.

Field ID	Analyte	Internal Standard High/Low	Qualification	Code
SA-O-1-SS-0.5-D	All VOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		12.5	x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samp

Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or us	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)			
14.2	Number of samples:	17			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
1	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

 Reviewer:
 Bart Brandenburg
 Project Name:
 Sauget - Area 2

 Date:
 8/17/2005
 Project Number:
 21561510.60011

 Laboratory
 Severn Trent Laboratory - Savannah
 SDG No.:
 SAS 006

 Review Level:
 Level III

Major Anomalies:

Samples were rejected based on holding times and surrogate recoveries.

Minor Anomalies:

Samples were qualified based on blanks, surrogates, LCS, and MS/MSD recoveries.

Field IDs: SA-O-1-SS-0.5 SA-O-1-SS-0.5-D SA-O-1-SB-3 SA-O-3-SS-0.5 SA-O-3-SB-4 SA-O-3-WS-9 SA-O-4-SS-0.5 SA-O-4-SB-6 SA-O-2-SS-0.5 SA-O-2-SB-5 SA-O-2-WS-9 SA-O-2-WS-9-D AT-Q-25-WS-9 SA-P-1-SS-0.5 SA-P-1-SS-0.5-D SA-P-1-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		1
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

Samples were reanalyzed outside of holding time due to QC analysis outside criteria.

The MS/MSD, surrogate, LCS, and internal standards had recoveries outside QC limits.

The method blank was spiked with the laboratory LCS solution, which required a reanalysis of several samples.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	Х		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (>			
	10 °C), then flag all positive results with a "J" and all non-detects "UJ".			,
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	х		

Note: Samples were analyzed outside of hold time.

Field ID	Analyte	Qualification	Code
SA-O-1-SS-0.5RE	All SVOCs	R	Н
SA-O-1-SS-0.5REDL	All SVOCs	R	Н
SA-O-1-SS-0.5-DRE	All SVOCs	R	Н
SA-O-1-SS-0.5-DREDL	All SVOCs	R	Н
SA-O-1-SB-3RE	All SVOCs	R	Н
SA-O-3-SS-0.5RE	All SVOCs	R	Н
SA-O-3-SB-6RE	All SVOCs	R	Н
SA-O-3-WS-9RE	All SVOCs	R	Н
SA-O-3-WS-9REDL	All SVOCs	R	Н
SA-O-4-SS-0.5RE	All SVOCs	R	Н
SA-O-4-SB-6RE	All SVOCs	R	Н
SA-O-4-SB-6REDL	All SVOCs	R	Н
SA-O-2-SS-0.5RE	All SVOCs	R	Н
SA-O-2-SB-5RE	All SVOCs	R	Н
SA-O-2-WS-9RE	All SVOCs	R	Н
SA-O-2-WS-9REDL	All SVOCs	R	Н
SA-O-2-WS-9-DRE	All SVOCs	R	Н
SA-O-2-WS-9-DREDL	All SVOCs	R	Н
AT-Q-25-WS-9RE	All SVOCs	R	Н
AT-Q-25-WS-9REDL	All SVOCs	R	Н
SA-P-1-SS-0.5RE	All SVOCs	R	Н
SA-P-1-SS-0.5-DRE	All SVOCs	R	Н
SA-P-1-SB-6RE	All SVOCs	R	Н
SA-P-1-WS-8RE	All SVOCs	R	Н

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

 <u> </u>		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	х		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: One of the method blanks was spiked with the LCS sample. All associated samples were qualified below.

Field ID	Analyte	Qualification	Code
SA-O-3-SB-4	All positive SVOCs	Ј	Z
SA-O-3-SB-4DL	All positive SVOCs	J	Z
SA-O-3-WS-9	All positive SVOCs	J	Z
SA-O-3-WS-9-DL	All positive SVOCs	J	Z
SA-O-4-SS-0.5	All positive SVOCs	J	Z
SA-O-4-SS-0.5DL	All positive SVOCs	J	Z
SA-O-4-SB-6	All positive SVOCs	J	Z
SA-O-2-SB-5	All positive SVOCs	J	Z
SA-O-2-WS-9	All positive SVOCs	J	Z
SA-O-2-WS-9DL	All positive SVOCs	J	Z
SA-P-1-SS-0.5	All positive SVOCs	J	" Z
SA-P-1-SS-0.5-D	All positive SVOCs	J	Z
SA-P-1-SB-6	All positive SVOCs	J	Z
SA-P-1-SB-6DL	All positive SVOCs	J	Z
SA-P-1-WS-8	All positive SVOCs	J	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.		7, 10	x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		·	х
II 6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)$ / $UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7.1	Are all samp	les listed on the a	ppropriate Surrogate Recovery	Summary Form?		X		
7.2	Are surrogate	recoveries within	n acceptance criteria specified i	in the QAPP for all samples a	nd method blanks?		х	
7.3	Are more than	n one of either fra	action outside the acceptance cr	iteria?		x		
7.4	If Yes in Sect	ion 7.3, are these	sample(s) or method blank(s)	reanalyzed?			x	
7.5	If Yes in Sect	ion 7.3, is any sa	mple dilution factor greater tha	n 10?				х
		recoveries disple/neutrals are ass		he MS and/or diluted sample	s, then no reanalysis is required and			
		> UCL	10% to LCL	< 10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				

Note: Several samples had surrogates outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate recoveries	Surrogate limits
SA-O-1-SS-0.5	2FP, FBP, NBZ, PHL, TPH	21, 24, 22, 25, 30	36-101, 38-104, 33-94, 38-102, 40-129
SA-O-1-SS-0.5RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-1-SB-3	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-3-SS-0.5	2FP, FBP, NBZ, PHL, TPH	22, 25, 19, 23, 34	36-101, 38-104, 33-94, 38-102, 40-129
SA-O-3-SS-0.5RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-3-SB-4	2FP, FBP, NBZ, PHL, TBP, TPH	15, 16, 13, 16, 18, 25	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-3-WS-9	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-3-WS-9RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-4-SS-0.5	2FP, NBZ, PHL	34, 31, 35	36-101, 33-94, 38-102
SA-O-4-SS-0.5RE	2FP, PHL	23, 30	36-101, 38-102
SA-O-4-SB-6	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-4-SB-6RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-2-SS-0.5	2FP, FBP, NBZ, PHL	28, 33, 26, 29	36-101, 38-104, 33-94, 38-102
SA-O-2-SB-5	2FP, NBZ, PHL	31, 29, 32	36-101, 33-94, 38-102
SA-O-2-SB-5RE	2FP, PHL	32, 33	36-101, 38-102
SA-O-2-WS-9	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-2-WS-9RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-2-WS-9-D	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-O-2-WS-9-DRE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
AT-Q-25-WS-9	2FP, FBP, NBZ, PHL, TBP, TPH	2, 1, 0, 1, 1, 2	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
AT-Q-25-WS-9RE	2FP, FBP, NBZ, PHL	18, 34, 27, 23	36-101, 38-104, 33-94, 38-102
SA-P-1-SS-0.5	2FP, FBP, NBZ, PHL, TBP	24, 31, 22, 27, 13	36-101, 38-104, 33-94, 38-102, 27-124
SA-P-1-SS-0.5RE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-P-1-SS-0.5-D	2FP, FBP, NBZ, PHL, TBP, TPH	21, 27, 20, 22, 7	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-P-1-SS-0.5-DRE	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-P-1-SB-6	2FP, FBP, NBZ, PHL	24, 31, 23, 26	36-101, 38-104, 33-94, 38-102
SA-P-1-SB-6RE	2FP, NBZ, PHL	25, 32, 33	36-101, 33-94, 38-102
SA-P-1-WS-8	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101, 38-104, 33-94, 38-102, 27-124, 40-129
SA-P-1-WS-8RE	2FP, FBP, PHL, TBP	14, 37, 23, 25	36-101, 38-104, 33-94, 38-102, 27-124

Field ID	Analyte	Qualification	Code
SA-O-1-SS-0.5	All SVOCs	J/UJ	S
SA-O-1-SS-0.5RE	All SVOCs	J/R	S
SA-O-1-SB-3	All SVOCs	J/R	S
SA-O-3-SS-0.5	All SVOCs	J/UJ	S
SA-O-3-SS-0.5RE	All SVOCs	J/R	S
SA-O-3-SB-4	All SVOCs	J/UJ	S
SA-O-3-WS-9	All SVOCs	J/R	S
SA-O-3-WS-9RE	All SVOCs	J/R	· S
SA-O-4-SS-0.5	All SVOCs	J/UJ	S
SA-O-4-SS-0.5RE	All SVOCs	J/UJ	S
SA-O-4-SB-6	All SVOCs	J/R	S
SA-O-4-SB-6RE	All SVOCs	J/R	S
SA-O-2-SS-0.5	All SVOCs	J/UJ	S
SA-O-2-SB-5	All SVOCs	J/UJ	S
SA-O-2-SB-5RE	All SVOCs	J/UJ	S
SA-O-2-WS-9	All SVOCs	J/R	S
SA-O-2-WS-9RE	All SVOCs	J/R	S
SA-O-2-WS-9-D	All SVOCs	J/R	S
SA-O-2-WS-9-DRE	All SVOCs	J/R	S
AT-Q-25-WS-9	All SVOCs	J/R	S
AT-Q-25-WS-9RE	All SVOCs	J/UJ	S
SA-P-1-SS-0.5	All SVOCs	J/UJ	S
SA-P-1-SS-0.5RE	All SVOCs	J/R	S
SA-P-1-SS-0.5-D	All SVOCs	J/UJ	S
SA-P-1-SS-0.5-DRE	All SVOCs	J/R	S
SA-P-1-SB-6	All SVOCs	J/UJ	S
SA-P-1-SB-6RE	All SVOCs	J/UJ	S
SA-P-1-WS-8	All SVOCs	J/R	S
SA-P-1-WS-8RE	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	Х		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require			
	rejection. RPD failures may be flagged "J" (+ only).			

Note:

For MS/MSD sample SA-O-3-SS-0.5, 33 out of 65 analytes were outside QC limits. For MS/MSD sample SA-O-2-WS-9, 57 out of 65 analytes were outside QC limits. Qualifications are listed below.

Field TD	Number of analytes out	Total analytes
SA-O-3-SS-0.5	33	65
SA-O-2-WS-9	57	65

Field ID	Analyte	Qualification	Code
SA-O-3-SS-0.5	All SVOCs	J/UJ	M
SA-O-2-WS-9	All SVOCs	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	Х		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.			х

Note:

For LCS Sample LCS 680-10237, 55 of 65 analytes were outside QC limits. For LCS sample 680-10560, 55 of 65 analytes were outside QC limits. Qualifications are listed below.

Field ID	Analytes out of Criteria	Total analytes
LCS 680-10237	55	65
LCS 680-10560	55	65

Field ID	Analyte	Qualification	Code
SA-O-1-SS-0.5	All SVOCs	J/UJ	L ·
SA-O-3-SS-0.5	All SVOCs	J/UJ	L
SA-O-4-SS-0.5	All SVOCs	J/UJ	L
SA-O-2-SB-5	All SVOCs	J/UJ	L
AT-Q-25-WS-9	All SVOCs	J/UJ	L
SA-P-1-SB-6	All SVOCs	J/UJ	L
SA-O-1-SS-0.5-D	All SVOCs	J/UJ	L
SA-O-3-SB-4	All SVOCs	J/UJ	L
SA-O-4-SB-6	All SVOCs	J/UJ	L
SA-O-2-WS-9	All SVOCs	J/UJ	L
SA-P-1-SS-0.5	All SVOCs	J/UJ	L
SA-P-1-WS-8	All SVOCs	J/UJ	L
SA-O-1-SB-3	All SVOCs	J/UJ	L
SA-O-3-WS-9	· All SVOCs	J/UJ	L
SA-O-2-SS-0.5	All SVOCs	J/UJ	L
SA-O-2-WS-9-D	All SVOCs	J/UJ	L
SA-P-1-SS-0.5-D	All SVOCs	J/UJ	L

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal star	ndard area of every sample a	and blank within upper and	lower QC limits for each conti	nuing calibration?		x	
		Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				
	The method spe	cification is for the continui	ng calibration to be compar	ed to the mid-point initial calil	bration, not sample to			
Note:	1 -	oration. Thus, if all other Qo hoose not to flag individual	-	a given sample, using informe	d professional judgment	, the		
10.2	Are retention tir	mes of internal standards wi	hin 30 seconds of the assoc	iated calibration standard?		X		
				positives or negatives exist. Ita for non-detects in that samp				

Note:

Several samples had internal standards outside QC limits. Qualifications are listed below.

Field ID	Analyte	IS Recoveries High/Low	Qualifications	Code
SA-O-1-SS-0.5DL	All SVOCs	Low	J/UJ	I
SA-O-1-SS-0.5-DDL	All SVOCs	Low	J/UJ	I
SA-P-1-SB-6DL	All detected SVOCs	High	J	I
SA-O-2-SB-5RE	All SVOCs	Low	J/UJ	I
SA-O-2-WS-9RE	All SVOCs	Low	J/UJ	I
SA-O-1-SB-3	All detected SVOCs	High	Ј	I
SA-O-4-SB-6	All detected SVOCs	High	J	I
SA-O-2-SB-5	All detected SVOCs	High	J	I
SA-O-2-WS-9	All detected SVOCs	High	J	I
SA-O-2-WS-9-D	All detected SVOCs	High	J	I
AT-Q-25-WS-9	All detected SVOCs	High	J	I
SA-P-1-WS-8	All detected SVOCs	High	J	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			v
	calibration?] ^
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do			
11.2	sample and standard relative ion intensities agree within 30%?			x

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?		•	x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			х

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D.

14.0 Data Completeness

 <u> </u>			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use	95% for aqueous sample, 90% for soil sample.)	Х		
14.2	Number of samples:	17			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	358			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	67.6			

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

8/18/2005

Project Number:

21561511.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.: Review Level: SAS006 Level III

Major Anomalies:

Samples were rejected based on holding times.

Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

Field IDs:

SA-O-1-SB-3

SA-O-3-SB-4

SA-O-3-WS-9

SA-O-4-SB-6

SA-O-2-SB-5

SA-O-2-WS-9

SA-O-2-WS-9-D

AT-Q-25-WS-9

SA-P-1-WS-8

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x	-	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.2	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of			
1.5	samples, analytical problems or special circumstances affecting the quality of the data?	x	x	

Note:

The laboratory case narrative indicated that the LCS, surrogate, and internal standard recoveries were outside QC limits.

The narrative also indicated that holding times were outside QC limits.

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

·		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was	000000000000000000000000000000000000000		
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
2.2	Time Table for sample holding time.) If yes, J(+)/UJ(-).	х		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days		3 T 100000 W	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).			

Note: Sample SA-O-3-SB-4 was re-extracted outside hold time. Qualifications are listed below.

Field ID	Analytes	Qualification	Code
SA-O-3-SB-4RE	All PCB analytes	R	Н

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	Х		
3.2	Do any method blanks have positive results (TCL)?		x	
 3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		х	-
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			х

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

[Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			х

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then J(+) only, a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			х

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA.
7.1	Are all samples listed on the a	opropriate Surrogate Recovery S	ummary Form?	x		
7.2	Are surrogate recoveries withi	n acceptance criteria specified in	the QAPP for all samples?		х	
7.3	If No in Section 7.2, were thes	e sample(s) or method blank(s) i	reanalyzed?		х	
7.4	If No in Section 7.3, is any sar	nple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)			х
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R		-	

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogates	Surrogate recoveries	Recovery limits
SA-O-3-SB-4	Decachlorobiphenyl-13C12	28	30-130
SA-O-3-SB-4	Tetrachloro-m-xylene	25	30-150
SA-O-2-SB-5	Tetrachloro-m-xylene	16	30-150
AT-Q-25-WS-9	Tetrachloro-m-xylene	24	30-150

Field ID	Analytes	Qualification	Code
SA-O-3-SB-4	All PCBs and pesticides	J/UJ	S
SA-O-2-SB-5	All Pesticides	J/UJ	S
AT-Q-25-WS-9	All Pesticides	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		-	х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?			
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

Field ID	Analytes	LCS / LCSD / RPD Recoveries	LCS / LCSD / RPD Limits
LCS 680-12541	Monochlorobiphenyl	29	30-130
LCS 680-12541	Tetrachlorobiphenyl	37	40-140
LCS 680-10717	DCB Decachlorobiphenyl	28	30-130
LCS 680-10717	Dichlorobiphenyl	27	30-130
LCS 680-10717	Heptachlorobiphenyl	31	40-140
LCS 680-10717	Hexachlorobiphenyl	30	40-140
LCS 680-10717	Monochlorobiphenyl	24	30-130
LCS 680-10717	Octachlorobiphenyl	30	40-140
LCS 680-10717	Tetrachlorobiphenyl	28	40-140
LCS 680-10717	Pentachlorobiphenyl	31	40-140
LCS 680-10717	Trichlorobiphenyl	29	30-130
LCS 680-10400	Endosulfan II	32 / 22 / 38	31-127 / 50
LCS 680-10400	Endrin ketone	65 / 42 / 30	47-156 / 50
LCS 680-10553	Endosulfan II	25/28/11	31-127 / 50

Field ID	Analytes	Qualifications	Code
SA-O-3-SB-4RE	Monochlorobiphenyl	J	L
SA-O-3-SB-4RE	Tetrachlorobiphenyl	UJ	L
SA-O-3-WS-9	All PCBs	J/UJ	L
SA-O-4-SB-6	All PCBs	J/UJ	L
SA-O-2-SB-5	All PCBs	J/UJ	L .
SA-O-2-WS-9	All PCBs	J/UJ	L
SA-O-2-WS-9-D	All PCBs	J/UJ	L
AT-Q-25-WS-9	All PCBs	J/UJ	L
SA-P-1-WS-8	All PCBs	J/UJ	L
SA-O-1-SB-3	Endosulfan II	UJ	L
SA-O-1-SB-3	Endrin ketone	UJ	L
SA-O-3-SB-4	Endosulfan II	UJ	L
SA-O-3-SB-4	Endrin ketone	UJ	L
SA-O-4-SB-6	Endosulfan II	UJ	L
SA-O-2-WS-9-D	Endosulfan II	UJ	L
SA-O-2-SB-5	Endosulfan II	UJ	L
AT-Q-25-WS-9	Endosulfan II	J	L
SA-O-3-WS-9	Endosulfan II	UJ	L
SA-O-2-WS-9	Endosulfan II	UJ	L
SA-P-1-WS-8	Endosulfan II	UJ	L

10.0 TCL Identi	fication (Code W)	Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
10.1	continuing calibration?			X

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			х
11.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples SA-O-2-WS-9 is the parent samples of SA-O-2-WS-9-D.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or u sample.)	se 95% for aqueous sample, 90% for soil	x		
13.2	Number of samples:	9			
13.3	Number of target compounds in each analysis:	21		1	
13.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$	-			
_	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
Date:	8/18/2005	Project Number:	21561510.60010
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 006
		Review Level:	Level III

Major Anomalies:

Samples were rejected based on surrogate recoveries.

Minor Anomalies:

Samples were qualified based on holding times, surrogate, LCS, and MS/MSD recoveries.

·			
Field IDs:	SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	SA-O-1-SB-3
	SA-O-3-SS-0.5	SA-O-3-SB-4	SA-O-3-WS-9
	SA-O-4-SS-0.5	SA-O-4-SB-6	SA-O-2-SS-0.5
	SA-O-2-SB-5	SA-O-2-WS-9	SA-O-2-WS-9-D
	AT-Q-25-WS-9	SA-P-1-SS-0.5	SA-P-1-SS-0.5-D
	SA-P-1-SB-6	SA-P-1-WS-8	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	Х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated that the MS/MSD, LCS, and surrogate recoveries were outside the QC limits.

It was also noted that the holding times for several samples were past limits.

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV were outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	х		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note: Several samples were analyzed outside of holding times. Qualifications are listed below.

Field ID	Analytes	Days late	Qualification	Code
SA-O-4-SS-0.5DL	All herbicides	. 1	J/UJ ·	Н
SA-O-4-SB-6DL	All herbicides	1	J/UJ	H
SA-O-2-SB-5DL	All herbicides	1	J/UJ	Н
SA-O-2-WS-9DL	All herbicides	1	J/UJ	Н
SA-O-2-WS-9-DDL	All herbicides	1	J/UJ	Н .
AT-Q-25-WS-9DL	All herbicides	1	J/UJ	Н
SA-P-1-SS-0.5DL	All herbicides	1	J/UJ	Н

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		Х	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			х

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	25 2 38 1.717		
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			_

Note:

5.0 Continuing Calibration (Code C)

			Yes	No	NA
L	5.1	Are Continuing Calibration Summary forms present and complete?			x
	5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
	5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
		If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
	5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

<u></u>					Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?				x		
6.2	Are surrogate	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?					
6.3	If No in Secti	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					
6.4	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					x	
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			<u> </u>
	Non-detect	None	UJ	R			

Note: Several surrogates were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-O-2-SB-5	DCAA	3	34-127
SA-O-2-SB-5DL	DCAA	0	34-127
SA-P-1-WS-8	DCAA	0	34-127

Field ID	Analytes	Qualification	Code
SA-O-2-SB-5	All Herbicides	J/R	S
SA-O-2-SB-5DL	All Herbicides	J/R	S
SA-P-1-WS-8	All Herbicides	J/R	S

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note: Sample SA-O-3-SS-0.5 was used as the MS/MSD sample. The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
SA-O-3-SS-0.5	Pentachlorophenol	-133 / 179 / 60	71-109 / 50

Field ID	Analyte	Qualification	Code
SA-O-3-SS-0.5	Pentachlorophenol	J	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		~
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		Х	
8.4	If Level IV, verify the % recoveries are calculated correctly.			х
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-10240	Pentachlorophenol	97 / 178 / 59	71-109 / 50

Field ID	Analyte	Qualification	Code
SA-O-1-SS-0.5	Pentachlorophenol	J	L
SA-O-1-SS-0.5-D	Pentachlorophenol	J	L
SA-O-1-SB-3	Pentachlorophenol	1.	L
SA-O-3-SS-0.5*	Pentachlorophenol	J	L
SA-O-3-SB-4	Pentachlorophenol	J	L

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
		angent, 0.7.1.1.2		

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		X		
12.2	Number of samples:	17			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	17			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	90			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2	
Date:	8/18/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	Laboratory - Savannah SDG No.:		
		Review Level:	Level III	
Major Anomalie	s:			
	No samples were rejected.			
Minor Anomalie	s:			
	Samples required qualification based on holding times, MS/MSD recoveries, a	and field duplicate RPDs.		
Field IDs:	SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	SA-O-1-SB-3	
	SA-O-3-SS-0.5	SA-O-3-SB-4	SA-O-3-WS-9	
	SA-O-4-SS-0.5	SA-O-4-SB-6	SA-O-2-WS-9	
	SA-O-2-SS-0.5	SA-O-2-SB-5	SA-P-1-SS-0.5	
	SA-O-2-WS-9-D	AT-Q-25-WS-9	SA-P-1-WS-8	
	SA-P-1-SS-0.5-D	SA-P-1-SB-6	. *	

1.0 Chain of C	Custody/Sample Condition/Raw Data		ICP		I	CP-M	1S		GFA.	4	CV	/AA-I	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x						35400			x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									X		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?										x		
1.4	Does sample preservation, collection and storage meet method requirements? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	x									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.										X		,

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that several mercury samples were analyzed outside holding times.

2.0 Holding Time (Code H) TCP ICP-MS GFA CVAA-Hg Yes No NA Yes NO NA Yes No NA Yes NO NA Yes No NA Yes NO NA Yes NO NA Yes NO NA Yes NO NA Yes No NA Yes NO NA Yes No NA Yes NO

Note: Several mercury samples were prepared outside holding times. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
SA-O-1-SS-0.5	Mercury	3	J	Н
SA-O-1-SS-0.5-D	Mercury	3	J	Н
SA-O-1-SB-3	Mercury	3	J	Н
SA-O-3-WS-9	Mercury	7	J	Н
SA-O-4-SS-0.5	Mercury	1	J	Н
SA-O-4-SB-6	Mercury	7	J	Н
SA-O-2-SS-0.5	Mercury	1	J	Н
SA-O-2-SB-5	Mercury	1	J	Н
SA-O-2-WS-9	Mercury	7	J	Н
SA-O-2-WS-9-D	Mercury	7	J	Н
AT-Q-25-WS-9	Mercury	1	J	Н
SA-P-1-SB-6	Mercury	6	j	Н

3.0 Instrument	Calibration (Code C)						ICP	·	IC	CP-M	S	(GFA.	1	CV	AA-	Hg
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards standard; GFAA: blank + t			,	MS: blank + one			х									
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: J	(+)/UJ(-).												х
3.3	Was an initial calibration Action: If no, use professinarrative.							х									х
3.4	Was continuing calibration whichever is more frequent the data and note in review	t? Action: I						x									х
3.5	Are all calibration standa Mercury (80%-120%) and			nd CCV) within t	he control limits			х									х
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)										10000		
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%	44900											
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%	# V 4.2									ák 7 Sprins		

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		I	CP-M	IS	Ü	GFA.A	A	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per							10000			9898512		
7.1	batch, per matrix and per level)?	X						1000000000			X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value											x	
7.2	are determined for positive and negative blank values.	X							(1000)			×	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to							1 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -					
7.5	determine affect on the data note in reviewer narrative.	X						(Alichine			Х		
	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours								\Box		865		
4.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on	Х							1 1		х		
	the data to note in reviewer narrative.												
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the		928794 3 Sept (v			0.000			2				
4.5	blank value are determined for positive and negative blank values.	X										X	: I
4.6	Are there samples with concentrations less than five times the highest level in associated								sing September				
7.0	blanks? Action: If yes, U at reported concentration.		X									X	. !
4.7	Are there samples with non-detect results or with concentrations less than five times the most					e gibidi d							
4.7	negative value in associated blanks? Action: If yes, J(+)/(UJ(-),		X	L				L				Х	. !

Note:

Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

ICP Interf	erence Check Sample (ICS) (Code N)		IC	P	I	CP-MS		GFAA		CVAA	-Hg
		Y	s N	o NA	Yes	No N.	A Yes	No N	ΑY	es No	NA
5.1	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	at the		x							
5.2	Are the ICS AB recoveries within 80% - 120%?			х					T		
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?			x							
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the leve ICS?	in the		x					Ì		
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)				19852						
	<-IDL > IDL <50% 50% - 79% > 120%					1					
	UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)		X45								

Note:

6.0 Labor	ratory Co	ontrol Samp	ole (LCS) (Co	de L - Recov	ery, Code E - F	RPD)			ICP		I	CP-M	IS	(GFA.	4	C	VAA-1	Hg
								Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1							20 samples, per batch,												
0.1	1						d with LCS results.	Х									Х		
6.2	, []	Is any LCS r	ecovery outsi	de the control	limits? (Aqueo	us limits: 80% -	120% - except Ag and	1	Х										
	·	Sb; Solid lin	nits: as per EF	A-EMSL/LV)				Х									X	
		Action:	Sc	lid		Aqueous		İ											
			< LCL	> UCL	< 50%	50% - 79%	> 120%	İ											
		,,	J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

Note:

7.0 Laborator	y Duplicates (Code K)		ICP		I	CP-M	1S	(GFA.	1	CV	AA-I	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20						l						
7.1	samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment,	х]				x		
	analytes not associated with Duplicate results.					1							
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional								5.72			1 55	
7.2	judgment. Note in worksheet.		Х							l		X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for												
7.5	aqueous, and RPD < 35% or difference $\leq \pm 2$ X PQL for solids) Action: If no, J(+).	X			7.00				i I		х	- 1	
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Samples SA-O-3-SS-0.5 and SA-P-1-SB-6 were analyzed in duplicate.

Spike Sam	ple Analysis -Pre	-Digestion (Code M	- Recovery, Code D - RP	D)		ICP		I	CP-M	IS	(GFA.A	1	CV	AA-	Hg
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	N
	Was a spiked	sample prepared and	analyzed at the correct fre	quency (one per 20 samples, per												
8.1	batch, per mat	rix and per level)? A	Action: If no, J(+), with pro	ofessional judgment, analytes not	X									X	I	
	associated wit	h matrix spike result	S		Spicon in											
8.2	Was a field bl	ank used for the MS	analysis? Action: If yes,	J(+) with professional judgment.		x			235						2003X	
0.2	Note in works	heet.				X									X.	
	Note: Matrix	spike analysis may	be performed on a field bl	ank when it is the only aqueous		823X									10/43/046	
	sample in an S												l			
				centration, are spike recoveries												
8.3	within the con	trol limit of 75-125%	6? (No control limit applies	to analytes with concentration>		x									x	
	4 x spike conc	entration.)	•													
		%R > 125%	30% < %R < 74%	%R < 30%												
	Positive	J	J	· J											Ī	_
	Non-detect	None	UJ	R				Policy and								

Note: Sample SA-O-3-SS-0.5 was spiked and analyzed for metals and sample SA-P-1-SB-6 was spiked and analyzed for mercury. Qualifications are listed below.

Field ID	Analyte	Recoveries	Limits
SA-O-3-SS-0.5	Antimony	42 / 41 / 3	75-125 / 20
SA-P-1-SB-6	Mercury	232 / 671 / 53	80-120 / 20

Field ID	Analyte	Qualification	Code
SA-O-3-SS-0.5	Antimony	UJ	M
SA-P-1-SB-6*	Mercury	J	M

9.0 Instrument Detection Limits (IDL) ICP ICP-MS GFAA CVAA-Hg Yes No NA Yes

Note:

10.0 ICP Serial	Dilutions (Code S)		ICP		I	CP-M	IS		GFA.	4	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	х											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	e x											

Note: Samples SA-O-3-SS-0.5, SA-0-4-SS-0.5, SA-P-1-SS-0.5, and SA-P-1-SB-6 were diluted and analyzed.

Note:

Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D. Some duplicate samples were outside QC limits. Qualifications are listed below.

Field ID	Analyte determination of the second of the s	Qualification	Code
SA-P-1-SS-0.5	Lead	J	F
SA-P-1-SS-0.5-D	Lead	J	F

12.0 Result Verif	fication (Code Q)		ICP		Ĭ	CP-M	IS	(GFA/	1	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									х
12.2	Were all dilution reflected in the positive results and detection limits?			х									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)				
13.2	Number of samples:	17	0	0	 17
13.3	Number of target compounds in each analysis:	22	22	0	1
13.4	Number of results rejected and not reported:	0	0	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100	####	 ####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Bart Bradenburg

Date:

8/16/2005

Laboratory

Severn Trent Laboratory - Savannah

Test Name:

Ammonia

Method No.:

350.1

Project Name:

Project Number:

SA-O-1-SB-3 SA-O-3-WS-9 SA-O-2-SS-0.5 SA-O-2-WS-9-D

SA-P-1-SS-0.5-D

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 006

Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified due to method blanks and field duplicate RPDs.

Field IDs:

SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	
SA-O-3-SS-0.5	SA-O-3-SB-4	
SA-O-4-SS-0.5	SA-4-SB-6	
SA-O-2-SB-5	SA-O-2-WS-9	
AT-Q-25-WS-9	SA-P-1-SS-0.5	
SA-P-1-SB-6	SA-P-1-WS-8	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

			Yes	No	NA
	2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
		If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was	-C		
	· . <u></u>	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
	2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
ļ		Time Table for sample holding time.) If yes, J(+)/UJ(-).		X	
	2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

<u> </u>			Yes	No	NA
	3.1	Is a Method Blank Summary form present for each batch?	x		
L	3.2	Do any method blanks have positive results?	х		
	3.3	Do any field/rinse/equipment blanks have positive results?		X	
		Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
	3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note: One of the method blank samples was recovered above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SA-P-1-SS-0.5	Ammonia	U	0.24	Z
SA-P-1-SS-0.5-D	Ammonia	U	0.21	Z

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.		-	v
				Α

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			X
5.2	Has a continuing calibration standard been analyzed every 10 samples?			х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			Х.
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			х

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	X	-	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

Sample SA-O-3-SS-0.5 was used as the MS/MSD sample. The MS/MSD parent sample concentrations were greater than 4X the spike concentrations, therefore no evaluation of data was required.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L- LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	X	··· , ,	
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		† — —
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.		-	Y
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT			
	in the continuing calibration?			х

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			х
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.		**************************************	x

Note:

10.0 Field Duplicate Samples (Code F)

<u> </u>		Yes	No	NA
10.1	Were any field duplicates submitted?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		X	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.	255 (an ann an Air an Air an Air an Air an Air an Air an Air an Air an Air an Air an Air an Air an Air an Air a		

Note: Samples SA-O-2-WS-9, SA-P-1-SS-0.5, and SA-O-1-SS-0.5 were the parent samples for SA-O-2-WS-9-D, SA-P-1-SS-0.5-D, and SA-O-1-SS-0.5-D.

Field 1D	Field Duplicate ID	Qualification	Code
SA-O-1-SS-0.5	SA-O-1-SS-0.5-D	J	F

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	X		

Note:

Sample SA-O-2-SS-.5 was analyzed in duplicate.

12.0 Data Completeness

			Yes	No	NA.
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or sample.)	use 95% for aqueous sample, 90% for soil	X		
12.2	Number of samples:	17			
12.3	Number of target compounds in each analysis:	1	 		l
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$		+		
	% Completeness	100			

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

7/14/2005

Project Number:

21561510.60011 SAS007

Laboratory

Severn Trent Laboratory - Savannah

SDG No.: Review Level:

Level III

Major Anomolies:

No samples were rejected.

Minor Anomolies:

No analytes required qualification, based on this data review.

Field IDs:

AA-SLAY-2-138

AA-SLAY-1-FB AA-SLAY-1-34 AA-SLAY-1-54

TB-8

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

	·						
					Yes	No	NA
2.1	Do sample preservat	ion, collection and stor	rage condition meet me	ethod requirements?	X		
	temperature is ouside	on and/or temperature verthe range 0° (but not 10°, flag positive determined)	frozen) to 10° flag all	<2° >6°C, etc.), comment in report. If unpreserved or positive results with a "J" and all non-detects "UJ". If ects "R".			
2.2	Have any technical h	nolding times, determin	ned from sampling to d	ate of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 °C ± 2 °C	14 days	14 days			
2.3	Have any technical h	olding times been gros	ssly (twice the holding	time) exceeded? If yes, J(+)/R(-).	 	X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA.
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			х
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			<u> </u>

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

<u></u>		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	_
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	X		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	·		

2 of 6

Note:

Toluene was detected above the MDL in the field blank AA-SLAY-1-FB. The associated samples were non-detect for toluene; therefore, no qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

	·	Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			X
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.		**************************************	x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	prosection (CC) - 1		x

Note:

6.0 Continuing Calibration (Code C)

·		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	8449.		х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.	T- 1	-A#96###################################	v

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sample	es listed on the ap	propriate Surrogate Recovery St	ummary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?			X			
7.3	If No in Secti	on 7.2, were these	sample(s) or method blank(s) re	eanalyzed?			х
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.					 :	
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			<u> </u>

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		•	х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x	·· ·· · · · · · · · · · · · · · · · ·	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

10.0 Internal Standards (Code I)

	·				Yes	No	NA
10.1	Are internal stan	dard areas for every sample	and blank within upper and	lower QC limits?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	continuing calib	cification is for the continuin ration. Thus, if all other QC eviewer may choose not to f	specifications are met for a	d to the mid-point initial calibration given sample, using informed pro- is case.	on, not sample to ofessional		
10.2	Are retention tim	nes of internal standards with	in 30 seconds of the associ	ated calibration standard?	X		
<u> </u>	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			shift of a large raction.			

Note:

11.0 TCL Identification (Code W)

r		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?		- "	x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

<u></u>		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			x

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		-	Х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)				
14.2	Number of samples:	6	X		
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Date:

7/14/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Sauget - Area 2

Project Number:

21561510.60011

SDG No.:

SAS 007 Level III

Review Level:

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on Internal Standards outside QC limits.

Field IDs:

AA-SLAY-2-138

AA-SLAY-4-140

AA-SLAY-1-FB

AA-SLAY-1-34

AA-SLAY-1-54

1.0 Chain of Custody/Sample Condition

_			Yes	No	NA
L	1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
	1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The case narrative indicated that the internal standards had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the			
	temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and			
	all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been			
2.2	exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes,			 -
2.3	J(+)/R(-).		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?		···	Х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			X
	If no, all standards, blanks, field samples and QC samples are rejected "R".	XXXXXXX 2022 A 32 N 80000000 S 32 1 P. 24000		

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

	Yes	No	NA
Is a Method Blank Summary form present for each batch?	X		
Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	· · · · · · · · · · · · · · · · · · ·
Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
If Level IV, review raw data and verify all detections for blanks were reported.			X
	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)? Do any field equipment blanks have positive results (TCL, and/or TIC)? Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)? Do any field equipment blanks have positive results (TCL, and/or TIC)? Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)? Do any field equipment blanks have positive results (TCL, and/or TIC)? Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			x
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			Х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			X
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			X

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samp	les listed on the a	appropriate Surrogate Recovery S	ummary Form?	X		
7.2	Are surrogate method blank		n acceptance criteria specified in	the QAPP for all samples and	x		·
7.3	Are more tha	n one of either fr	action outside the acceptance crite	eria?		X	
7.4	If Yes in Sect	ion 7.3, are these	sample(s) or method blank(s) rea	analyzed?			x
7.5	If Yes in Sect	If Yes in Section 7.3, is any sample dilution factor greater than 10?					X
		C recoveries displ lysis is required					
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).	page through an elemental to the Samuel Samu		

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		<u> </u>
	Action for specific compound outside the acceptance criteria: $R>UCL$, $J(+)$ only; LCL , $J(+)/UJ(-)$; 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only).			
9.4	If Level IV, verify the % recoveries are calculated correctly.			х

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal stan	ndard area of every sample ar calibration?	nd blank within upper and l	ower QC limits for		x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	initial calibration met for a given s	cification is for the continuin n, not sample to continuing casample, using informed profe amples in this case.	alibration. Thus, if all othe	r QC specifications are			
10.2	Are retention tin standard?	nes of internal standards with	nin 30 seconds of the associ	ated calibration	X		
	exist. For shift of	omatogram must be examine of a large magnitude, the revi ects in that sample/fraction.					

Note: The internal standards for sample AA-SLAY-2-138 had recoveries outside QC limits; the qualifications are listed below.

Field ID	Analyte	IS Recoveries	Internal Standards	IS Limits	Qualification	Code
AA-SLAY-2-138 A	All SVOCs	92765 / 393170 / 288498	DCB/NPT/A	111529-446116 / 501849-2007394 / 329579-13183	J/UJ	I

11.0 TCL Identification (Code W)

_			Yes	No	NA
$\ $	11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the			
İL	B 1 [. l	standard RRT in the continuing calibration?			X
	11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the			
L	11.2	sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			X

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spect			<u>x</u>
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.		#6000000000000000000000000000000000000	x

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			X
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil).			
	J(+) only.			

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limits aqueous sample, 90% for soil sample)	nit: Check QAPP or use 95% for	Application of the state of the		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			-
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	100		·	

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Bart Brandenburg

Date:

7/14/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Sauget - Area 2

Project Number:

21561510.60010

SDG No.: Review Level: SAS 007 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AA-SLAY-2-138

AA-SLAY-4-140

AA-SLAY-1-FB

AA-SLAY-1-34

AA-SLAY-1-54

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the CCV had recoveries outside the QC limits, and although it is beyond the scope of this review, it should be noted.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	х		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10		· · · · · · · · · · · · · · · · · · ·	
	^o C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table			
2.2	for sample holding time.) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	·x		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.		<u> </u>	
3.4	If Level IV, review raw data and verify all detections for blanks were reported.	1		Х

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			X

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	Station		х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response \geq 20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D \geq 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			Х

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all sample	es listed on the app	propriate Surrogate Recovery St	ummary Form?	X		
6.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples?	X		
6.3	If No in Section	on 6.2, were these	sample(s) or method blank(s) re	eanalyzed?			x
6.4	If No in Section	on 6.3, is any samp	ole dilution factor greater than 1	0? (Surrogate recoveries may be diluted out.)			x
		> UCL	10% to LCL	< 10%		· · · · · ·	
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X.		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

The narrative indicated MS/MSD results outside QC limits; however the MS/MSD sample for this batch was not analyzed with this SDG. No qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: $R>UCL$, $J(+)$ only; LCL , $J(+)/UJ(-)$; $I(+)/R(-)$. RPD failures should be flagged "J" (+ only).			

Note:

9.0 TCL Identification (Code W)

F			Yes	No	NA
	0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
	9.1	calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

[Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	****		x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.		386.5.5	x

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		X	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		-	х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 9.	5% for aqueous sample, 90% for soil sample.)	X	-	
12.2	Number of samples:	5			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.2 \times 12.3) - 12.4) / (12.2 \times 12.3)$				
	% Completeness	100	+		

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2	
Date:	7/15/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 007	
		Review Level:	Level III	

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification.

Field IDs:

AA-SLAY-2-138

AA-SLAY-4-140

AA-SLAY-1-FB AA-SLAY-1-34

AA-SLAY-1-54

1.0 Chain of Custody/Sample Condition/Raw Data

			ICP		I	CP-M	IS	GFAA			CVAA-Hg		Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									X		
1.3	Do the traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?											X	
1.4	Does sample preservation, collection and storage meet method requirements? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4 {}^{\circ}\text{C} \pm 2 {}^{\circ}\text{C}$)	X									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x								-	X		

Note: The laboratory case narrative indicated that the serial dilution had %RPDs outside the QC limits.

2.0 Holding Time (Code H)

			ICP		I	ICP-MS			GFAA			CVAA-H		
<u> </u>		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA	
2.1	Have any technical holding times, determined from date of collection to date of analysis, beer exceeded? (Hg: 28 days, other metals: 6 months) See attached Holding Time Table.	nÎ	x									X		
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.													

Note:

3.0 Instrument Calibration (Code C)

							ICP		I	CP-M	(S		GFA.	4	C	/AA-	Hg
			·			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand				: blank + one standard			х									
3.2	Are the correlation coeffici	ents > 0.995	(for GFAA and C	CVAA) Action: J((+)/UJ(-).												х
3.3	Was an initial calibration v no, use professional judgm							х						-			x
3.4	Was continuing calibratio whichever is more frequen data and note in reviewer n	it? Action:						х									x
3.5	Are all calibration standard (80%-120%) and other Me			CCV) within the	control limits? Mercury			х		·							х
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)	14.50			7.70								
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%					-							
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%					_							

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		I	CP-M	1S	(GFA.	4	C	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										х	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										Х		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		X									х	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).	į	x									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

								ICP		IO	CP-M	1S		GFA.	4	CV	/AA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS beginning	AB analyzed or once every	at beginning of 8 hours (whiche	each ICP run (o	r at least twice event) for ICP-MS?	ery 8 hours), and at th	e		х									
5.2			ies within 80% -						х									
5.3	Are the re	sults for unspi	ked analytes (in 1	ICS A) < + IDL?					х									
5.4	If not, are	the associated	sample Al, Ca, I	Fe, and Mg conc	entrations less than	the level in the ICS?			х				i					
	Action:	Not Spik	ed Analytes	Spiked	analytes (ICS AE	analytes)												
		<-IDL	> IDL	< 50%	50% - 79%	> 120%								<u> </u>				l
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)								†				

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

								ICP		I	CP-M	1S		GFA.	4	CV	AA-I	Hg
								No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	matrix and	per level)? Ac	tion: If no, J(-	+) any sample no	ot associated with		X									X		
6.2		S recovery outsiss: as per EPA-E		limits? (Aqueo	ous limits: 80% -	120% - except Ag and Sb	;	X									x	
	Action:	Sc	olid		Aqueous										•			
		< LCL	> UCL	< 50%	50% - 79%	> 120%												
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)								37.00				

Note:

7.0 Laboratory Duplicates (Code K)

			ICP		IC	CP-M	IS	,	GFA.	4	CV	'AA-I	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per										100 X		
7.1	batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	x									x		
	associated with Duplicate results.												
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.		x								***************************************		
7.2	Note in worksheet.		X			2000						Х	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for										100 m		
,	aqueous, and RPD < 35% or difference $\leq \pm 2$ X PQL for solids) Action: If no, $J(+)$.	X								i	X		ĺ
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: All RPD's were within criteria. A sample not associated with this SDG was analyzed as the duplicate sample.

8.0 Spike Sample Analysis - Pre-Digestion (Code M - Recovery, Code D - RPD)

							ICP		I	CP-M	IS	1	GFA.	4	CV	/AA-	Hg
							No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	per matrix and with matrix sp	d per level)? Action: oike results.	If no, J(+), with professio	uency (one per 20 samples, pal judgment, analytes not a	ssociated	x									X		
8.2	in worksheet.			(+) with professional judgme			x									Х	
	Note: Matrix in an SDG.	spike analysis may b	e performed on a field blan	k when it is the only aqueou	is sample												
8.3		of 75-125%? (No co		ration, are spike recoveries v ytes with concentration > 4											X		
		%R > 125%	30% < %R < 74%	%R < 30%													
	Positive	J	J	J												_	
	Non-detect	None	UJ	R		10.449¥											

Note: A sample not associated with this SDG was spiked and analyzed with some recoveries outside QC limits. No qualification of data was required.

9.0 Instrument Detection Limits (IDL)

		ICP		I	CP-M	ſS	1	GFA.	4	CV	'AA-	Hg
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1 Are all IDL equal to or less than the reporting limits specified?	G.		х									x

Note:

10.0 ICP Serial Dilutions (Code S)

			ICP		I	CP-M	ſS		GFA.	4	CV	/AA-	Hg
I		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			94								
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, $J(+)$.		х										

Note: Sample AA-SLAY-2-138 was diluted and analyzed with %RPDs outside QC limits. However all results were less than 50x the IDL in the original sample; therefore no qualification of data was required.

11.0 Field Duplicate Samples (Code F)

			ICP		I	CP-M	1S	(3FA.	4	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		х									х	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$.)			х									x

Note:

12.0 Result Verification (Code Q)

			ICP		I	CP-M	1S		GFA.	4	CV	'AA-l	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									x
12.2	Were all dilution reflected in the positive results and detection limits?			х									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)						
13.2	Number of samples:	5		0	0		5
13.3	Number of target compounds in each analysis:	22	- 	0	0		1
13.4	Number of results rejected and not reported:	0		0	 0		0
	% Completeness = $100 \times ((13.2 \times 13.3) - 13.4) / (13.2 \times 13.3)$				-		
	% Completeness	100	-	####	####	·	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Bart Brandenburg

Date:

7/14/2005

Laboratory

Severn Trent Laboratory - Savannah

Test Name:

Ammonia

Method No.:

350.1

Project Name: Project Number: SDG No.:

Review Level:

Sauget - Area 2 21561510.60011

SAS 007 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on field blank contamination. Qualifications are listed in the appropriate section below.

Field IDs:

AA-SLAY-2-138

AA-SLAY-4-140 AA-SLAY-1-FB AA-SLAY-1-34 AA-SLAY-1-54

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.2	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of			
1.3	samples, analytical problems or special circumstances affecting the quality of the data?		X	
Motor	No. and the second seco			

Note: No anomalies were encountered.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
1	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
2.2	Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
2.3				
2.3	Time Table for sample holding time.) If yes, J(+)/UJ(-). Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?	х		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			х

Note: The field blank sample reported ammonia above the MDL; qualifications are listed below.

Field ID	Analyte	Qualification	Code
AA-SLAY-1-34	Ammonia	U	X
AA-SLAY-1-54	Ammonia	Ū	X

4.0 Initial Calibration (Code C)

A 1 A no Initial Calibratian and Calibratian a		
4.1 Are Initial Calibration summary forms present and complete for each	instrument used?	 х
4.2 Are correlation coefficients stable (>0.995) over the concentration rar	nge of the instrument?	x
If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detect	ts "R".	 · ·
4.3 If Level IV, recalculate the correlation coefficient to verify correct calculate the correlation coefficient calculate the correct calculate the calculate the correct calculate the correct calculate the correct calculate the correct calculate the correct calculate the correct calculate the correct calculate the calculate the correct calculate the calculate the calculate the calculate the calculate the calculate the calculate the calculate the calculate the calculate the calculate the calculate the calculate the calculate the	lculations are being made.	 x

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?	P P S		Х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.	†	l	x

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

			Yes	No	NA
L	6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
1	6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each			
	0.2	matrix?	X		
ı	6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
		Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
		criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may	1		
		require rejection. RPD failures may be flagged "J" (+ only).			

Note:

The MS/MSD sample had recoveries outside QC limits. however, the parent sample was not included in this SDG; therefore no qualification of data was required.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

	Yes	No	NA
Is an LCS recovery form present?	x	-	
Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		†
If Level IV, verify the % recoveries are calculated correctly.			x
Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).<="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
RPD failures should be flagged "J" (+ only).			
-	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix? Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP? If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).<="" td="" uj(-);=""><td>Is an LCS recovery form present? Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix? Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP? If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).<="" td="" uj(-);=""><td>Is an LCS recovery form present? Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix? Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP? If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).<="" td="" uj(-);=""></lcl,></td></lcl,></td></lcl,>	Is an LCS recovery form present? Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix? Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP? If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).<="" td="" uj(-);=""><td>Is an LCS recovery form present? Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix? Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP? If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).<="" td="" uj(-);=""></lcl,></td></lcl,>	Is an LCS recovery form present? Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix? Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP? If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).<="" td="" uj(-);=""></lcl,>

Note:

8.0 Analyte Identification

		Yes	No	NA
R 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT		-	
0.1	in the continuing calibration?			Х

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			X
9.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			- A

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		х	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and			
11.1	per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X	
	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for aqueous, and RPD $< 35\%$ or			
11.3	difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results	X		
	are > 5 X IDL.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or us	se 95% for aqueous sample, 90% for soil			
12.1	sample.)				
12.2	Number of samples:	5			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0	-		
	% Completeness = $100 \times ((12.2 \times 12.3) - 12.4) / (12.2 \times 12.3)$			·	
	% Completeness	100			

			t.	

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

8/10/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.: Review Level: SAS008 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate and Internal standard recoveries.

Field IDs:

SA-P-3-SS-1.5

SA-P-3-SB-4

SA-P-3-WS-14

SA-P-2-SS-0.5

SA-P-2-SB-5

SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.2	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt,			
1.5	condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the surrogate and LCS recoveries were outside QC limits.

Although it is beyond the scope of this review, it should be noted that the CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservat	tion, collection and sto	orage condition meet n	nethod requirements?	x		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".						
2.2	Have any technical l J(+)/UJ(-).	nolding times, determi	ned from sampling to	date of analysis, been exceeded? If yes,		x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 °C_±2 °C	14 days	14 days			
2.3	Have any technical l	nolding times been gro	ossly (twice the holdin	g time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			х

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

 		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			X

Note: The method blank had positive results for methylene chloride. However, this method blank was not associated with any samples in this SDG.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.	or		х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial a continuing calibration RRF outside QC limits (%D < 20%)? If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For		1	x
	%D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samp	les listed on the ap	propriate Surrogate Recovery	Summary Form?	X		
7.2	Are surrogate	e recoveries within	n acceptance criteria specified i	n the QAPP for all samples?		х	
7.3			e sample(s) or method blank(s)			x	
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.) Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted						х
		no reanalysis is		imples chosen for the M5/M5L	or anuted		
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R		,	

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Sample ID	Surrogate recoveries	Surrogates	Surrogate Limits
SA-P-3-WS-14	66 / 62	BFB / TOL	68-121 / 65-128
SA-P-3-WS-14RA	64	TOL	65-128
SA-P-2-SS-0.5	0/0/0	BFB / DBFM / TOL	68-121 / 66-127 / 65-128
SA-P-2-WS-9	51 / 35	DBFM / TOL	66-127 / 65-128
SA-P-2-WS-9RA	49 / 39	DBFM / TOL	66-127 / 65-128

BFB=4-Bromofluorobenzene DBFM=Dibromofluoromethane TOL=Toluene-d8

Sample ID	Analytes	Qualification	Code
SA-P-3-WS-14	All VOCs	J/UJ	S
SA-P-3-WS-14RA	All VOCs	J/UJ	S
SA-P-2-SS-0.5	All VOCs	J/R	S
SA-P-2-WS-9	All VOCs	J/UJ	S
SA-P-2-WS-9RA	All VOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate petwenty for each matrix?			х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).	ne		

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No .	. NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: Several LCS recoveries were outside QC limits; however, these LCS samples were not associated with samples in this SDG. No qualification of data was required.

10.0 Internal Standards (Code I)

<u> </u>				Yes	No	NA
10.1	Are internal standard areas for ever	y sample and blank within	upper and lower QC limits?		х	
	Area > +100%	Area < -50%	Area < -10%			
	Positive J	J	J			
	Non-detect None	UJ	R			
Note:	The method specification is for the calibration, not sample to continuin sample, using informed professionathis case.	g calibration. Thus, if all o	ther QC specifications are met for	r a given		
10.2	Are retention times of internal stand	dards within 30 seconds of	the associated calibration standard	i? x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects that sample/fraction.			xist. For		

Note: Internal standards were outside QC limits. Qualifications are listed below.

Field ID	Analytes	IS Recoveries Low/High	Qualification	Code
SA-P-3-SS-1.5	All VOCs	IS Recoveries Low	J/UJ	I
SA-P-3-SS-1.5RA	All VOCs	IS Recoveries Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11 11 1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			<u>x</u>

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		х	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Chec 90% for soil sample.)	k QAPP or use 95% for aqueous sample	, x		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Review Level:

Sauget - Area 2

Date:

8/5/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS008 Level III

Major Anomalies:

All reanalyzed samples were rejected due to holding time limits being exceeded.

Minor Anomalies:

Samples were qualified estimated (J/UJ) based on blank contamination and LCS and Internal standard recoveries outside QC limits.

Field IDs:

SA-P-3-SS-1.5

SA-P-3-SB-4

SA-P-3-WS-14

SA-P-2-SS-0.5

SA-P-2-SB-5

SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Ye	s	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x			
	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x			
	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of				
1.5	samples, analytical problems or special circumstances affecting the quality of the data?	X			

Note:

Samples had to be reanalyzed outside of holding time due to method blank contamination.

The LCS, surrogate, and internal standards had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	х		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note:

All samples were re-extracted 37 days outside of holding time; qualifications are listed below.

Sample ID	Analytes	Qualification	Code
SA-P-3-SS-1.5RA	All SVOC analytes	R	Н
SA-P-2-SS-0.5RA	All SVOC analytes	R	Н
SA-P-3-SB-4RA	All SVOC analytes	R	Н
SA-P-2-SB-5RA	All SVOC analytes	R	Н
SA-P-3-WS-14RA	All SVOC analytes	R	Н
SA-P-2-WS-9RA	All SVOC analytes	R	Н

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

 		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.		200100000000000000000000000000000000000	
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

After examination of the blank sample, it appeared that the sample had been inadvertently spiked the LCS sample. This was confirmed with the lab on a phone conversation on 8/8/05. All results will be qualified estimated (J).

Field ID	Analyte	Qualification	Code
SA-P-3-SS-1.5	All detected SVOCs	J	Z
SA-P-3-SB-4	All detected SVOCs	J	Z
SA-P-3-WS-14	All detected SVOCs	J	. Z
SA-P-2-SS-0.5	All detected SVOCs	J	Z
SA-P-2-SB-5	All detected SVOCs	J	Z
SA-P-2-WS-9	All detected SVOCs	J	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	4.5		х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			х

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			- 11
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	7.1 Are all samples listed on the appropriate Surrogate Recovery Summary Form?			Summary Form?	X		
7.2	Are surrogate	recoveries within	coveries within acceptance criteria specified in the QAPP for all samples and method blanks? ne of either fraction outside the acceptance criteria?			х	
7.3	Are more than	n one of either fra					
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?				x		
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?						X
	Note: If SMC recoveries display unacceptable recoveries in the MS and/or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.						<u></u>
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

Surrogate recoveries were outside QC limits due to dilutions; therefore, no qualification of data was required.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		•	х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).	·		

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

 		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		х	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.			х

Note: The LCS had several analytes outside QC limits. Qualifications are listed below.

LCSID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10560	Acenaphthene	25	36-108
LCS 680-10560	Acenaphtyylene	27	41-112
LCS 680-10560	Anthracene	30	46-115
LCS 680-10560	Benzo(a)anthracene	31	46-116
LCS 680-10560	Benzo(a)pyrene	29	37-120
LCS 680-10560	Benzo(b)fluoranthene	31	35-122
LCS 680-10560	Benzo(g,h,i)perylene	21	41-122
LCS 680-10560	Benzo(k)fluoranthene	32	36-124
LCS 680-10560	Bis(2-chloroethoxy)methane	21	38-106
LCS 680-10560	Bis(2-chloroethyl)ether	17	30-98
LCS 680-10560	4-Bromophenyl phenyl ether	23	38-106
LCS 680-10560	Butyl benzyl phthalate	40	43-127
LCS 680-10560	Carbazole	31	47-118
LCS 680-10560	4-Chloro-3-methylphenol	23	39-113
LCS 680-10560	2-Chloromaphthalene	25	41-110
LCS 680-10560	2-Chlorophenol	20	36-99
LCS 680-10560	4-Chlorophenyl phenyl ether	23	42-111
LCS 680-10560	Chrysene	31	46-118
LCS 680-10560	Dibenz(a,h)anthracene	22	41-124
LCS 680-10560	Dibenzofuran	27	44-108
LCS 680-10560	1,3-Dichlorobenzene	19	34-90
LCS 680-10560	1,2-Dichlorobenzene	19	35-93
LCS 680-10560	1,4-Dichlorobenzene	19	32-90
LCS 680-10560	2,4-Dichlorophenol	22	43-108
LCS 680-10560	Diethyl phthalate	28	41-118
LCS 680-10560	2,4-Dimethylphenol	24	40-112
LCS 680-10560	Dimethyl phthalate	28	43-114
LCS 680-10560	Di-n-butyl phthalate	32	35-93
LCS 680-10560	2,4-Dinitrotoluene	28	32-128
LCS 680-10560	2,6-Dinitrotoluene	28	38-128
LCS 680-10560	Di-n-octyl phthalate	28	43-129
LCS 680-10560	Fluoranthene	28	41-124
LCS 680-10560	Fluorene	26	37-113
LCS 680-10560	Hexachlorobenzene	28	46-115

LCS ID	Analytes	LCS Recoveries	LCS Limits
LCS 680-10560	Hexachlorobutadiene	19	43-105
LCS 680-10560	Hexachlorocyclopentadiene	18	20-109
LCS 680-10560	Hexachloroethane	17	31-88
LCS 680-10560	Indeno[1,2,3-cd]pyrene	18	36-133
LCS 680-10560	Isophorone	21	37-106
LCS 680-10560	2-Methylnaphthalene	22	39-104
LCS 680-10560	2-Methylphenol	22	38-107
LCS 680-10560	3 & 4 Methylphenol	22	37-106
LCS 680-10560	Naphthalene	22	34-97
LCS 680-10560	2-Nitroaniline	25	38-124
LCS 680-10560	4-Nitroaniline	28	32-130
LCS 680-10560	Nitrobenzene	19	33-106
LCS 680-10560	2-Nitrophenol	22	38-104
LCS 680-10560	N-Nitrosodi-n-propylamine	18	24-108
LCS 680-10560	Pentachlorophenol	5	27-116
LCS 680-10560	Phenanthrene	31	47-114
LCS 680-10560	Phenol	21	34-98
LCS 680-10560	1,2,4-Trichlorobenzene	19	36-98
LCS 680-10560	2,4,5-Trichlorophenol	24	46-116
LCS 680-10560	2,4,6-Trichlorophenol	23	44-113
SA-P-3-SS-1.5	All SVOCs	J/UJ	L
SA-P-2-SS-0.5	All SVOCs	J/UJ	L
SA-P-3-SB-4	All SVOCs	J/UJ	L
SA-P-2-SB-5	All SVOCs	J/UJ	L
SA-P-3-WS-14	All SVOCs	J/UJ	L
SA-P-2-WS-9	All SVOCs	J/UJ	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal stan calibration?	dard area of every sample a	nd blank within upper and lo	ower QC limits for each continu	ing x		
		Area $> +100\%$	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	sample to contin		l other QC specifications are	d to the mid-point initial calibra e met for a given sample, using amples in this case.			
10.2	Are retention tin	nes of internal standards with	hin 30 seconds of the associ	ated calibration standard?	X		
				positives or negatives exist. For the data for non-detects in that	r shift of a		

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.		300000	x

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		х	
13.2	Were all RPD or absolute difference values within the control limits?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		·	

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Chesoil sample.)	eck QAPP or use 95% for aqueous sample, 90% for	X		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	65		-	
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer:

Date:

Bart Brandenburg

8/10/2005

Laboratory Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561511.60011

SAS008 Level III

Major Anomalies:

All PCB samples were rejected due to holding times outside criteria.

Minor Anomalies:

Samples were qualified based on the LCS.

Field IDs:

SA-P-3-SB-4

SA-P-3-WS-14

SA-P-2-SB-5

SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that LCS recoveries were outside QC limits

Surrogate recoveries were also outside QC limits due to dilutions.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached			
2.2	Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).	X .		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	х		

Note: All PCB samples were extracted 27 days outside holding time criteria. Qualifications are listed below.

Field IDs:	Analytes	Qualification	Code
SA-P-3-SB-4	All PCBs	R	· H
SA-P-3-WS-14	All PCBs	R	Н
SA-P-2-SB-5	All PCBs	R	Н
SA-P-2-WS-9	All PCBs	R	Н

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

	Yes	No	NA
Is a Method Blank Summary form present for each batch?	X		
Do any method blanks have positive results (TCL)?		x	
Do any field/rinse/equipment blanks have positive results (TCL)?		х	 -
Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
If Level IV, review raw data and verify all detections for blanks were reported.			x
	Do any method blanks have positive results (TCL)? Do any field/rinse/equipment blanks have positive results (TCL)? Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.	Is a Method Blank Summary form present for each batch? Do any method blanks have positive results (TCL)? Do any field/rinse/equipment blanks have positive results (TCL)? Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.	Is a Method Blank Summary form present for each batch? Do any method blanks have positive results (TCL)? Do any field/rinse/equipment blanks have positive results (TCL)? Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			X
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			-
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			x

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the ap	propriate Surrogate Recovery S	Summary Form?	x		
7.2	Are surrogate recoveries within	acceptance criteria specified in	the QAPP for all samples?		х	
7.3	If No in Section 7.2, were these	sample(s) or method blank(s)	reanalyzed?		х	
7.4	If No in Section 7.3, is any sam	ple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)	x		
	> UCL	10% to LCL	< 10%	,, <u>-</u> ,,		
	Positive J	J	J		•	
	Non-detect None	UJ	R			

Note:

The surrogates were diluted out of the samples. No qualification of data was required.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	"
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	Х		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	ж		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		Х	
9.4	If Level IV, verify the % recoveries are calculated correctly.	4.0.000, 3.3,000,000,000,000		x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

The LCS had recoveries outside the QC limits. Qualifications are listed below.

Field ID	Analytes	LCS Limits	LCS Recoveries
SA-P-3-SB-4	All PCBs / Endosulfan II	30-130 / 31-127	All below Limits
SA-P-3-WS-14	All PCBs / Endosulfan II	30-130 / 31-127	All below Limits
SA-P-2-SB-5	All PCBs / Endosulfan II	30-130 / 31-127	All below Limits
SA-P-2-WS-9	All PCBs / Endosulfan II	30-130 / 31-127	All below Limits

Field ID	Analytes	Qualification	Code
SA-P-3-SB-4	All PCBs / Endosulfan II	J/UJ	L
SA-P-3-WS-14	All PCBs / Endosulfan II	J/UJ	L
SA-P-2-SB-5	All PCBs / Endosulfan II	J/UJ	L
SA-P-2-WS-9	All PCBs / Endosulfan II	J/UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
10.1	continuing calibration?			х
 		<u> </u>		

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			х
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
11.4	If Level IV, calculate a sample of positive results to verify correct calculations.		XX-4000	x

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		х	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
<u> </u>	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP of soil sample.)	or use 95% for aqueous sample, 90% for	X	-	
13.2	Number of samples:	1			·
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Date:

Bart Brandenburg

8/5/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Sauget - Area 2

21561510.60010

Project Number:

SDG No.:

SAS008

Review Level:

Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

SA-P-3-SS-1.5

SA-P-3-SB-4

SA-P-3-WS-14

SA-P-2-SS-0.5

SA-P-2-SB-5

SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of			
1.5	samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage conditions meet method requirements?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was	100 200 677		
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time.) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.	Is a Method Blank Summary form present for each batch?	X		
3.	Do any method blanks have positive results?		X	
3.	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated RL for estimate (laboratory "J" flagged) concentrations.	d to the		
3.	If Level IV, review raw data and verify all detections for blanks were reported.			х

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			х

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 12 hours?	33.4		х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.	-		
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the a	X				
6.2	6.2 Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?					
6.3	If No in Section 6.2, were thes			. x		
6.4	If No in Section 6.3, is any sar	nple dilution factor greater than I	0? (Surrogate recoveries may be diluted out.)			х
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			х
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J"(+ only).			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

-		Yes	No	NA
8.1	Is an LCS recovery form present?	х		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.	890902203 [ja.]		х
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only).			

9.0 TCL Identification (Code W)

		Yes	No	NA
0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
9.1	continuing calibration?			X

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?			х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
10.4	If Level IV, calculate a sample of positive results to verify correct calculations.			х

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		х	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample.)		ж		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	10	7		
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100	1		

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2	
Date:	8/10/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS008	
		Review Level:	Level III	

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on holding times and blank contamination.

Field IDs:

SA-P-3-SS-1.5 SA-P-3-SB-4 SA-P-3-WS-14

SA-P-2-SS-0.5

SA-P-2-SB-5

SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition/Raw Data ICP ICP-MS **GFAA** CVAA-Hg No NA Yes No NA Yes Yes No NA Yes No NA 1.1 X X Do Chain-of-Custody forms list all samples that were analyzed? 1.2 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained? X Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample 1.3 receipt, condition of samples, analytical problems or special circumstances affecting the quality X of the data? Does sample preservation, collection and storage meet method requirement? (water samples: 1.4 X with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C +2 °C) Are the digestion logs present and complete with pH values, sample weights, dilutions, final 1.5 volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete X documentation, contact the laboratory for explanation/resubmittal.

Note: The laboratory case narrative indicated that the samples were analyzed outside holding times for mercury.

2.0 Holding Time (Code H)		ICP		ICP-MS		1S	GFAA		Ą	CVAA-Hg		Hg	
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								x		
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.												

Note: All samples were analyzed outside holding times for mercury. Qualifications are listed below.

Field ID	Analytes	Qualification	Code	Late
SA-P-3-SS-1.5	Mercury	J	Н	1
SA-P-3-SB-4	Mercury	J	Н	1
SA-P-3-WS-14	Мегсигу	Ј	Н	1
SA-P-2-SS-0.5	Mercury	Ј	Н	1
SA-P-2-SB-5	Mercury	Ј .	Н	1
SA-P-2-WS-9	Mercury	J	Н	1

.0 Instrumen	t Calibration (Code C)						ICP		I	CP-M	1S	(GFA.	A	CV	'AA-	Hg
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards standard; GFAA: blank +			,	MS: blank + one			х									
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: J	(+)/UJ(-).												х
3.3	Was an initial calibration Action: If no, use profess narrative.							х									х
3.4	Was continuing calibration whichever is more frequent the data and note in review	t? Action: I	f no, use professi					х									х
3.5	Are all calibration standa Mercury (80%-120%) and			nd CCV) within t	he control limits	?		х									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)							3 27					
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%	977673.3 86763.3						930				$\neg \uparrow$	
_	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%							7.0	-				

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

	•		ICP		I	CP-N	1S		GFA.	A	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	X						-				х	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	452420466666									x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										X	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		х									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									X	

Note: Several target analyte values were detected above the IDL. Qualifications are listed below.

Field ID	Analytes	Qualification	Code	New RL
SA-P-3-SS-1.5	Sodium	U	P	360
SA-P-2-SB-5	Sodium	U	P	380

5.0 ICP Inter	ference Check	Sample (ICS	S) (Code N)					ICP		I	CP-M	1S		GFA.	A	CV	AA-I	Нg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1					least twice every uent) for ICP-MS	8 hours), and at the			х						х			
5.2	Are the IC	S AB recover	ries within 80%	- 120%?					х						х			
5.3	Are the res	sults for unsp	iked analytes (in	ICS A) < + IDL	?				х						х		\neg	
5.4	If not, are ICS?	the associate	d sample Al, Ca	, Fe, and Mg con	ncentrations less t	han the level in the			х						х			
	Action:	Not Spik	ced Analytes	Spike	d analytes (ICS A	B analytes)												
		< -IDL	> IDL	< 50%	50% - 79%	> 120%							25 (25) 4000000					
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

6.0	Laboratory	Control Samp	le (LCS) (Co	ode L - Reco	very, Code E - I	RPD)			ICP		I	CP-M	IS	(GFA.	4	CV	/AA-l	Hg
								Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	6.1				he correct frequence (+) any sample n		amples, per batch, pe th LCS results.	er X									X		
	6.2	Is any LCS re Sb; Solid lim				us limits: 80% - 1	120% - except Ag ar	d	x									Х	
1		Action:	So	lid		Aqueous									(
			< LCL	> UCL	< 50%	50% - 79%	> 120%								200				
L	<u>_</u>		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

Note:

7.0 Labo	atory Duplicates (Code K)		ICP		I	CP-M	IS		GFA.	A	C	VAA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 2	0										П	
7.	samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgmer	t, x									x		
	analytes not associated with Duplicate results.												
7.	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with profession	al				1530			89015				
/	judgment. Note in worksheet.		A									X	
7.	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for	r											
'	aqueous, and RPD < 35% or difference < +2 X PQL for solids) Action: If no, J(+).	X									X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.				Turky Money Million Co. 11								

Note:

Spike Sam	ple Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)		ICP		I	CP-N	4S		GFA	Ą	CV.	AA-l	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	N
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.										x		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment Note in worksheet.		x									x	_
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.				-								
8.3	For all analytes with sample concentration $< 4 \times 10^{-5}$ x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration $< 4 \times 10^{-5}$ x spike concentration.)										x		
	%R > 125% 30% < %R < 74% %R < 30%										0.678.000 2.000	一	_
	Positive J J J											一	_
	Non-detect None UJ R						\vdash	2.00			Section 1		_

Note:

Sample SA-P-3-SB-4 was spiked and analyzed as the MS/MSD.

9.0 Instrument Detection Limits (IDL)		ICP		I	CP-M	1S		GFA.	A	CV	/AA-	Hg
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1 Are all IDL equal to or less than the reporting limits specified?			х									х

Note:

10.0 ICP Seria	Dilutions (Code S)		ICP		I	CP-M	1S	(GFA.	4	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	X											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the												
10.5	original sample? If no, J(+).	X				1							ı "

Note:

	11.0 Field Dupl	licate Samples (Code F)		ICP	•	I	CP-M	1S	(GFA.	A	CV	/AA-	Hg
-			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
I	11.1	Were any field duplicates submitted for metal analysis?		х									х	
	11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ±2 x PQL and for solids, RPD < 100% or difference < ±4 x PQL)			x									х

Note:

12.0 Result Ver	rification (Code Q)		ICP		I	CP-M	1S	(GFA.	١	CV	'AA-)	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									х
12.2	Were all dilution reflected in the positive results and detection limits?			х									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)							
13.2	Number of samples:	6		0	C	7	6	
13.3	Number of target compounds in each analysis:	22		0	C	T	 1	
13.4	Number of results rejected and not reported:	0		0	0		0	
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)					1	 	
	% Completeness	100	#	###	##:	##	100	

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
Date:	8/5/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS008
Test Name:	Ammonia	Review Level:	Level III

Major Anomalies:

Method No .:

No samples were rejected.

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

SA-P-3-SS-1.5

350.1

SA-P-3-SB-4

SA-P-3-WS-14

SA-P-2-SS-0.5

SA-P-2-SB-5

SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	Х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, Chain-of-Custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirements?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevate (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".	d		
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	-	X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			· x

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?		_	х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

Note:

5.0 Continuing Calibration (Code R)

			Yes	No	NA
L	5.1	Are Continuing Calibration Summary forms present and complete?			x
	5.2	Has a continuing calibration standard been analyzed every 10 samples?			х
ŀ	5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
		If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R			
	5.4	If Level IV, calculate a sample of %Rs.			х

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only).			

Note:

Sample SA-P-3-SB-4 was spiked and analyzed as the MS/MSD.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.	,000 (100,000,000,000)		x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only).<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td>-</td></lcl,>			-

Note:

8.0 Analyte Identification

 		Yes	No	NA
Q 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in			
0.1	the continuing calibration?			х

Note:

9.0 Analyte Quantitation and Reported Detection limits

i 		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			х
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			X
9.4	If Level IV, calculate a sample of positive results to verify correct calculations.			x

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		х	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
L	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		х -	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			х
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.		:	х

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous s	sample, 90% for soil			
12.1	sample.)		X		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	1	ا ا		
12.4	Number of results rejected and not reported:	0	1		
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)		7		
	% Completeness	100	╡		

		,	

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:

Date:

Achintya Bezbaruah

Laboratory

8/1/2005

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS009 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

AA-Q-9-132	AA-Q-9-FB	AA-Q-9-118
AA-CLAY-1-26	AA-Q-9-38	AA-SLAY-1-74
AA-CLAY-1-46	AA-Q-9-58	AA-SLAY-1-94
AA-O-4-42	AA-Q-9-78	AA-SLAY-1-114
AA-O-4-62	AA-Q-9-78-D	AA-SLAY-1-132
AA-O-4-82	AA-Q-9-98	TB-9

1.0 Chain of Custody/Sample Condition

 		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservat	ion, collection and stor	rage condition meet m	ethod requirement?	X		
	temperature is outsic		frozen) to 10° flag al	, <2°>6°C, etc.), comment in report. If unpreserved or l positive results with a "J" and all non-detects "UJ". If ects "R".			
2.2	Have any technical h	olding times, determin	ned from sampling to o	late of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4 {}^{\circ}\text{C} \pm 2 {}^{\circ}\text{C}$	14 days	14 days			
2.3	Have any technical h	olding times been gro	ssly (twice the holding	time) exceeded? If yes, J(+)/R(-).		x	-

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes No) NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?		х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.		x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.		х

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	-		x

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			Х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			Х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
_	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7.1	Are all sampl	es listed on the ap	propriate Surrogate Recovery Su	ımmary Form ?		X		
7.2	Are surrogate	recoveries withir	acceptance criteria specified in	the QAPP for all samples?	Į.	x		
7.3	If No in Secti	on 7.2, were these	e sample(s) or method blank(s) re	eanalyzed?				х
7.4	If No in Secti	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			t.)			х
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.							
		> UCL	10% to LCL	< 10%	-			
	Positive	J	J	J				
	Non-detect	None	UJ	R				

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			Х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X	-	
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal stan	dard areas for every sample	and blank within upper and	l lower QC limits?	.		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	continuing calibi		specifications are met for a	ed to the mid-point initial calibration given sample, using informed prossesses.			
10.2	Are retention tim	nes of internal standards with	in 30 seconds of the associ	ated calibration standard?	X		
				positives or negatives exist. For s ta for non-detects in that sample/fit			

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			X
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			X
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			X

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X	-	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

For sample AA-Q-9-78 a field duplicate (AA-Q-9-78-D) was collected.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or us sample)	e 95% for aqueous sample, 90% for soil	x		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	33			,
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:Achintya BezbaruahProject Name:Sauget - Area 2Date:8/1/2005Project Number:21561510.60011LaboratorySevern Trent Laboratory - SavannahSDG No.:SAS 009

Review Level:

Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on LCS recoveries.

AA-O-4-82

Field IDs: AA-Q-9-132 AA-Q-9-FB AA-Q-9-118 AA-CLAY-1-26 AA-Q-9-38 AA-SLAY-1-74 AA-CLAY-1-46 AA-Q-9-58 AA-SLAY-1-94 AA-O-4-42 AA-Q-9-78 AA-SLAY-1-114 AA-O-4-62 AA-Q-9-78-D AA-SLAY-1-132

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

AA-Q-9-98

Note:

Surrogates for some samples were recovered outside of QC limits.

LCS recoveries for some samples were outside of QC limits.

The narrative also indicated analytical results for some samples were reported from diluted analyses due to elevated levels of target compounds exceeding the linear range.

The SVOC internal standard Perylene-d12 was recovered outside of QC limits in one sample.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".	**************************************	•	1
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			1

Note:

4.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	-
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			X
			L	

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			Х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	1297		x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			х

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	7.		х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.		·	
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7.1	Are all samp	les listed on the a	ppropriate Surrogate Recovery S	Summary Form ?	· · · · · · · · · · · · · · · · · · ·	х		
7.2	Are surrogate	recoveries within	n acceptance criteria specified in	the QAPP for all samples a	and method blanks?	x		
7.3	Are more tha	n one of either fra	ection outside the acceptance crit	eria?			X	
7.4	If Yes in Sec	tion 7.3, are these	sample(s) or method blank(s) re	analyzed?				x
7.5	If Yes in Sec	tion 7.3, is any sa	mple dilution factor greater than	10?				х
			ay unacceptable recoveries in the eutrals are assessed separately.	e MS and/ or diluted sample	es, then no reanalysis is			
		> UCL	10% to LCL	< 10%				
	Positive	J	J	Ј				
	Non-detect	None	UJ	R				

Note: Surrogates in sample AA-O-4-62 (run #2) were diluted out. - No qualification of data was required.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

-			Yes	No	NA
	8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
	8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			х
	8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			х
		Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with			
		other QC criteria and determine the need for qualification of the data for samples from the same site/matrix.			
		Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		х	
	Action for specific compound outside the acceptance criteria: $R>UCL$, $J(+)$ only; LCL , $J(+)/UJ(-)$; $I(+)/R(-)$. RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			х

Note: LCS recoveries for 4-Chloroaniline and 3,3-Dichlorobenzidine were outside QC limits. See the table below for qualifications:

Analyte	Recovery	Criteria
4-Chloroaniline	18%	22-107%
3,3-Dichlorobenzidine	2%	29-101%

Field ID	Analyte	Qualification	Code
AA-SLAY-1-114	4-Chloroaniline	J	L
AA-Q-9-132	4-Chloroaniline	UJ	L
AA-CLAY-1-26	4-Chloroaniline	UJ	L
AA-CLAY-1-46	4-Chloroaniline	UJ	L
AA-O-4-42	4-Chloroaniline	ÚJ	L
AA-O-4-62	4-Chloroaniline	UJ	L
AA-O-4-82	4-Chloroaniline	UJ	L
AA-Q-9-FB	4-Chloroaniline	UJ	L
AA-Q-9-38	4-Chloroaniline	UJ	L
AA-Q-9-58	4-Chloroaniline	UJ	L
AA-Q-9-78	4-Chloroaniline	UJ	L
AA-Q-9-78-D	4-Chloroaniline	UJ	L
AA-Q-9-98	4-Chloroaniline	UJ	L
AA-Q-9-118	4-Chloroaniline	UJ	L
AA-SLAY-1-74	4-Chloroaniline	UJ	L
AA-SLAY-1-94	4-Chloroaniline	UJ	L
AA-SLAY-1-132	4-Chloroaniline	UJ	L

Field ID	Analyte	Qualification	Code
AA-Q-9-132	3,3-Dichlorobenzidine	UJ	L
AA-CLAY-1-26	3,3-Dichlorobenzidine	UJ	L
AA-CLAY-1-46	3,3-Dichlorobenzidine	UJ	L
AA-O-4-42	3,3-Dichlorobenzidine	UJ	L
AA-O-4-62	3,3-Dichlorobenzidine	UJ	L
AA-O-4-82	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-FB	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-38	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-58	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-78	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-78-D	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-98	3,3-Dichlorobenzidine	UJ	L
AA-Q-9-118	3,3-Dichlorobenzidine	UJ	L
AA-SLAY-1-74	3,3-Dichlorobenzidine	UJ	L
AA-SLAY-1-94	3,3-Dichlorobenzidine	UJ	L
AA-SLAY-1-114	3,3-Dichlorobenzidine	UJ	L
AA-SLAY-1-132	3,3-Dichlorobenzidine	UJ	L

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal stan calibration?	dard area of every sample a	nd blank within upper and le	ower QC limits for each con	tinuing		х	
	L	Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R			•	ļ ——
Note:	sample to contin	uing calibration. Thus, if al	ng calibration to be compare I other QC specifications are cose not to flag individual sa	e met for a given sample, us	libration, not ing informed			
10.2			hin 30 seconds of the associ			X		
	Action: The chr large magnitude,	omatogram must be examin , the reviewer may consider	ed to determine if any false partial or total rejection of the	positives or negatives exist.	For shift of a			

Note: The recovery of Perylene-d12 in sample AA-SLAY-1-132 was below QC criteria.

Field ID	Analyte	Qualification	Code
AA-SLAY-1-132	All SVOCs	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
11.1	continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass			
11.2	spectrum; and do sample and standard relative ion intensities agree within 30%?	1		Х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			х

Note:

13.0 Field Duplicate Samples (Code F)

r		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AA-Q-9-78 and AA-Q-9-78-D are a parent /duplicate pair.

14.0 Data Completeness

,			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use soil sample)	95% for aqueous sample, 90% for	X		
14.2	Number of samples:	17		·	
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0	1		
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Achintya Bezbaruah

Project Name:

Review Level:

Sauget - Area 2

Date:

8/1/2005

Project Number:

21561510.60010

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 009 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AA-Q-9-132	AA-Q-9-FB
AA-CLAY-1-26	AA-Q-9-38
AA-CLAY-1-46	AA-Q-9-58
AA-O-4-42	AA-Q-9-78
AA-O-4-62	AA-Q-9-78-D
AA-O-4-82	AA-Q-9-98

AA-Q-9-118

AA-SLAY-1-74 AA-SLAY-1-94

AA-SLAY-1-114

AA-SLAY-1-132

1.0 Chain of Custody/Sample Condition

T			Yes	No	NA
1.	.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.	.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.		Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		. ,

Note:

The narrative indicated that the CCV had recoveries outside the QC limits, however, it is beyond the scope of this review, but it should be noted.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			-
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		х	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			-
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?	62		х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			Х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.		2 C C C C C C C C C C C C C C C C C C C	·
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	Yes	No	NA
6.1	Are all samples listed on the a	appropriate Surrogate Recovery	Summary Form ?	x		
6.2	Are surrogate recoveries with	in acceptance criteria specified i	n the QAPP for all samples?	x		
6.3	If No in Section 6.2, were the	se sample(s) or method blank(s)	reanalyzed?			x
6.4	If No in Section 6.3, is any sa	mple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)			X
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		Х	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	22	х	
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	I(+) only: <i "i"="" (+="" <10%="" be="" cl.="" failures="" flagged="" i="" i(+)="" i(-):="" only).<="" r(-).="" rpd="" should="" td=""><td></td><td></td><td></td></i>			

Note:

9.0 TCL Identification (Code W)

 		Yes	No	NA
0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			-
9. 1	continuing calibration?			X

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?	10.40		х
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			X

Note:

11.0 Field Du	plicate Samples (Code F)	Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	X	-	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples AA-Q-9-78 and AA-Q-9-78-D are a parent /duplicate pair.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP sample)	or use 95% for aqueous sample, 90% for soil	x		
12.2	Number of samples:	17			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.2 x 12.3) - 12.4) / (12.2 x 12.3)				
	% Completeness	100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Achintya Bezbaruah	Project Name:	Sauget - Area 2
Date:	8/1/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 009
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs:	AA-Q-9-132	AA-Q-9-FB	AA-Q-9-118
	AA-CLAY-1-26	AA-Q-9-38	AA-SLAY-1-74
	AA-CLAY-1-46	AA-Q-9-58	AA-SLAY-1-94
	AA-O-4-42	AA-Q-9-78	AA-SLAY-1-114
	AA-O-4-62	AA-Q-9-78-D	AA-SLAY-1-132
	AA-O-4-82	AA-Q-9-98	

1.0 Chain d	of Custody/Sample Condition/Raw Data		ICP		I	CP-N	1S		GFA	4	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	ж									х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	х									х		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		х									X	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C + 2^{\circ}C$)	X									x		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									X		

Note: The laboratory case narrative indicated that the serial dilution had %Ds outside the QC limits.

2	2.0 Holding	Time (Code H)		ICP		I	CP-M	IS		GFA.	A	C١	VAA-I	Hg
_			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
ľ	2.1	Have any technical holding times, determined from date of collection to date of analysis, been		x										
L	2.1	exceeded? (Hg: 28 days, other metals: 6 months) See attached Holding Time Table.		X				L					X	
ı		Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)								4				
L		J(+)/R(-).												Į!

Note:

3.0 Instrum	nent Calibration (Code C)						ICP		I	CP-M	1S		GFA.	A	C	VAA-	Hg
	· · · · · · · · · · · · · · · · · · ·					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	ΝA
3.1	Are sufficient standards in GFAA: blank + three stand			•	blank + one standard	,		х									х
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: J	(+)/UJ(-).												х
3.3	Was an initial calibration vano, use professional judgm					f		х									х
3.4	Was continuing calibration whichever is more frequent data and note in reviewer is	nt? Action:						x									х
3.5	Are all calibration standar (80%-120%) and other Me	•	`	CCV) within the o	control limits? Mercury	/ (1)		х									х
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)	- 200											
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	.111% - 125%	> 125%				Maria Marian						Janas (1966)		

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		I	CP-N	1S	(GFA/	4	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									x		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		x									x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x		,							x	

Note: Several target analyte values were detected above the IDL in the method blank; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP I	nterference Ch	eck Sample (ICS) (Code N)					ICP		I	CP-M	1S		GFA.	4	C	VAA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1					r at least twice evuent) for ICP-MS	very 8 hours), and at the			x									
5.2	Are the IC	S AB recover	ries within 80% -	120%?					х	4.0.578.00								
5.3	Are the re	sults for unspi	iked analytes (in	ICS A) < + IDL	?				х									
5.4	If not, are	the associated	l sample Al, Ca, I	Fe, and Mg cond	entrations less that	an the level in the ICS?			х									
	Action:	Not Spik	ced Analytes	Spiked	l analytes (ICS Al	3 analytes)												
		<-IDL	> IDL	< 50%	50% - 79%	> 120%												
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

6.0 Labora	tory Control Sample (LCS) (Code L - Recovery, Code E - RPD)		ICP		IC	CP-M	S	(GFAA		CVA	A-Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA Y	Yes N	lo NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	x									х	
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and St Solid limits: as per EPA-EMSL/LV));	x									x
	Action: Solid Aqueous								7739			
	<lcl> UCL <50% 50% - 79% > 120%</lcl>										20 243 2	-A-
	J(+)/UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)											

Note:

7.0 Labor	atory Duplicates (Code K)	ICP			<u> </u>		I		ICP-MS		(GFA.	1	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA			
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per	1450200) r											
7.1	batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	x			9000007, °		ĺ				x		I			
	associated with Duplicate results.	16-32			ana ka											
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.		24.73 24.73 24.73			W										
7.2	Note in worksheet.		X			1665						X				
73	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for							Senio.			7342(6) ₀					
, ,,,	aqueous, and RPD < 35% or difference < +2 X PQL for solids) Action: If no, J(+).	X			arus.						X		l			
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.															

Note:

) Spike S	ample Analysis	-Pre-Digestion (Cod	le M - Recovery, Code D -	RPD)		ICP		IC	CP-M	IS		GFA.	4	CV	/AA-	Hg
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked per matrix and with matrix sp	d per level)? Action:	analyzed at the correct frequency If no, J(+), with profession	uency (one per 20 samples, per bat nal judgment, analytes not associal	ch, ed x									X		
8.2	Was a field blin worksheet.	ank used for the MS	analysis? Action: If yes, J	(+) with professional judgment. No	ote	Х					7777				Х	
-	Note: Matrix an SDG.	spike analysis may be	performed on a field blank	when it is the only aqueous sample	in											
8.3	For all analyte control limit of concentration.	of 75-125%? (No c	ntration < 4 x spike concent ontrol limit applies to anal	ration, are spike recoveries within types with concentration $> 4 \times 800$	he ke x									X		
		%R > 125%	30% < %R < 74%	%R < 30%												
	Positive	J	J	J												
	Non-detect	None	UJ	R												

Note: Sample AA-Q-9-38 was spiked and analyzed

9.1 Are all IDL equal to or less than the reporting limits specified? Yes No NA Yes N	9.0 Instrument Detection Limits (IDL)		ICP		I	CP-N	1S		GFA.	Ą	C	/AA-	Hg
9.1 Are all IDL equal to or less than the reporting limits specified?		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	9.1 Are all IDL equal to or less than the reporting limits specified?			х									х

Note:

10.0 ICP Se	rial Dilutions (Code S)		ICP		I	CP-M	1S		GFA.	4	C/	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	x											

Note:

1	11.0 Field Duplicate Samples (Code F)			ICP		ICP-MS		ſS	GFAA			CVAA-Hg		Hg
=			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
Ĺ	11.1	Were any field duplicates submitted for metal analysis?	х									х		
	11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$)	X							·		х		

Note: Samples AA-Q-9-78 and AA-Q-9-78-D are a parent /duplicate pair.

12.0 Result Verification (Code Q)			ICP		ICP-MS		MS GFA		GFA/	AA CVAA-		Hg	
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									x
12.2	Were all dilution reflected in the positive results and detection limits?	100 S		х									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)					
13.2	Number of samples:	17	0	0		17
13.3	Number of target compounds in each analysis:	22	 0	0		1
13.4	Number of results rejected and not reported:	0	0	 0		0
	% Completeness = $100 \times ((13.2 \times 13.3) - 13.4) / (13.2 \times 13.3)$				-	
	% Completeness	100	####	 ####		100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Achintya Bezbaruah

Project Name:

Sauget - Area 2

Date:

8/1/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.: Review Level: SAS 009 Level III

Test Name: Method No.: Ammonia

350.1

•

Major Anomalies:

No samples were rejected

Minor Anomalies:

One sample required qualification based on MS/MSD recoveries.

Field IDs:

AA-Q-9-FB
AA-Q-9-38
AA-Q-9-58
AA-Q-9-78
AA-Q-9-78-D
AA-Q-9-98

AA-Q-9-118

AA-SLAY-1-74

AA-SLAY-1-94

AA-SLAY-1-114

AA-SLAY-1-132

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x	-	
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

No anomalies were encountered.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was	30,000,000	_	
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached			
2.2	Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		Х	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	х	-	
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.		<u> </u>	
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			X

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".	7.2000000000000000000000000000000000000		
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			X

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?		-	Х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			X

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample AA-Q-9-132 was spiked and analyzed. Ammonia had a recovery below criteria. Qualifications are listed below.

Analyte	Recovery	<u>Criteria</u>
Ammonia	53/53	90-110

Field ID	Analyte	Qualification	Code
AA-Q-9-132	Ammonia	J	М

7.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			х
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

8.0 Analyte Identification

-			Yes	No	NA
H	0 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard			
	8.1	RRT in the continuing calibration?			Х

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			х
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	3		x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	Х		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Samples AA-Q-9-78 and AA-Q-9-78-D are a parent /duplicate pair.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X	-
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	X		

Note:

Sample AA-SLAY-1-132 was duplicated and analyzed.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or soil sample)	use 95% for aqueous sample, 90% for	x		
12.2	Number of samples:	17			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.2 \times 12.3) - 12.4) / (12.2 \times 12.3)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET **VOLATILE ORGANIC ANALYSIS**

Reviewer:

Date:

Bart Brandenburg

8/25/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 010 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on internal standard and surrogate recoveries.

Field IDs:

AT-Q-21-SB-6 SA-S-2-SS-1.5 SA-S-1-SB-5 AT-Q-20-SS-1 SA-Q-8-SS-0.5

AT-Q-21-WS-8-D SA-S-1-SS-0.5

AT-Q-20-SB-6

SA-Q-1-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples analytical problems or special circumstances affecting the quality of the data?	, x		

Note:

The laboratory case narrative indicated that MS/MSD, LCS, and internal standards were recovered outside QC limits.

AT-Q-21-WS-8

SA-S-2-SB-4

SA-S-1-WS-9

SA-Q-1-SS-1

SA-Q-8-SB-5

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservat	ion, collection and sto	rage condition meet m	ethod requirement?	X		
	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R".				·		
2.2	Have any technical h	olding times, determin	ned from sampling to	date of analysis, been exceeded? If yes, J(+)/UJ(-).	1	х	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 °C ±2 °C	14 days	14 days			
2.3	Have any technical h	olding times been gro	ssly (twice the holding	g time) exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?		х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.		х
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.		Х

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination).

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	7.5		x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.		,	x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.		S388886553953834-1, 4-1,	

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7.1	Are all sampl	es listed on the ap	propriate Surrogate Recovery S	ummary Form ?		X		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all sample	s?		x	
7.3	If No in Secti	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?				x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)							х
	Note: If SMC reanalysis is r		ot meet acceptance criteria in san	nples chosen for the MS/	MSD or diluted samples, then no			
		> UCL	10% to LCL	< 10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R			-	

Note: Surrogate recoveries were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate recoveries	Surrogate Limits
AT-Q-20-SB-6	4-Bromofluorobenzene	64	68-121
SA-Q-1-SS-1	4-Bromofluorobenzene	43	68-121

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	All VOCs	J/UJ	S
SA-Q-1-SS-1	All VOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AT-Q-20-SB-6 was used as the MS/MSD sample. The MS/MSD had several analytes outside QC limits. All LCS samples associated with this MS/MSD were within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

Note: LCS recoveries were above QC limits. The associated samples were non-detect for the analytes that recovered above the QC limits in the LCS. No qualification of data was required.

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal stan	dard areas for every sample	and blank within upper an	d lower QC limits?		х	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	continuing calib		specifications are met for	ed to the mid-point initial calibratio a given sample, using informed pro-			
10.2		nes of internal standards wit			X		
	Action: The chr magnitude, the r	omatogram must be examin eviewer may consider partia	ed to determine if any false I or total rejection of the da	e positives or negatives exist. For shata for non-detects in that sample/fra	nift of a large		

Note: Several internal standards were outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Internal standards High/Low	Code
AT-Q-20-SB-6	All VOCs	J/UJ	Low	I
SA-Q-1-SS-1	All VOCs	J/UJ	Low	I
SA-Q-1-SB-6	All VOCs	J/UJ	Low	I
SA-Q-1-SS-1RA	All VOCs	J/UJ	Low	I
SA-Q-1-SB-6RA	All VOCs	J/UJ	Low	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?		·	Х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-WS-8 was the parent sample to AT-Q-21-WS-8-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample)	nple, 90% for soil	x		
14.2	Number of samples:	14			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Date: 8/25/2005

Laboratory Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 010

Level III

Major Anomalies:

Samples were rejected based on hold time criteria.

Minor Anomalies:

Samples were qualified based on surrogate and internal standard recoveries.

Field IDs:

AT-Q-21-SB-6	AT-Q-21-WS-8
SA-S-2-SS-1.5	SA-S-2-SB-4
SA-S-1-SB-5	SA-S-1-WS-9
AT-Q-20-SS-1	SA-Q-1-SS-1

SA-S-1-SS-0.5 AT-Q-20-SB-6 SA-Q-1-SB-6

AT-Q-21-WS-8-D

SA-Q-8-SS-0.5

SA-Q-8-SB-5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	х		

Note:

Samples had to be reanalyzed outside of holding time due to surrogates outside OC limits.

The LCS had recoveries outside QC limits.

Surrogate analytes had recoveries outside QC limits

2.0 Holding Time/ Preservation (Code H)

 		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, $J(+)/UJ(-)$.	x		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			ĺ
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	х		

Note: Several samples were re-extracted outside holding times. Qualifications are listed below.

Field ID	Analyte	Days Late	Qualification	Code
AT-Q-21-SB-6RE	All SVOCs	34	R	Н
AT-Q-21-WS-8RE	All SVOCs	34	R	Н
AT-Q-21-WS-8REDL	All SVOCs	34	R	Н
AT-Q-21-WS-8-DRE	All SVOCs	34	R	Н
SA-S-2-SS-1.5RE	All SVOCs	34	R	Н
SA-S-2-SB-4RE	All SVOCs	34	R	Н
SA-S-2-SB-4REDL	All SVOCs	34	R	Н
SA-S-1-SS-0.5RE	All SVOCs	34	R	Н
SA-S-1-SB-5RE	All SVOCs	34	R	Н
SA-S-1-SB-5REDL	All SVOCs	34	R	Н
SA-S-1-WS-9RE	All SVOCs	34	R	Н
AT-Q-20-SB-6RE	All SVOCs	34	R	Н
AT-Q-20-SS-1RE	All SVOCs	34	R	Н
SA-Q-1-SS-1RE	All SVOCs	34	R	Н
SA-Q-1-SB-6RE	All SVOCs	34	R	Н
SA-Q-8-SS-0.5RE	All SVOCs	34	R	Н
SA-Q-8-SB-5RE	All SVOCs	34	R	Н
SA-Q-8-SB-5REDL	All SVOCs	34	R	Н

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?		·	х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			. х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	х		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			-

Note:

Several analytes in the method blank were detected above the MDL. The blank sample was associated with the reanalyzed samples which were previously rejected. No qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7.1	Are all samp	oles listed on the ap	propriate Surrogate Recovery	Summary Form ?		x		
7.2	Are surrogate	e recoveries within	acceptance criteria specified in	the QAPP for all samples ar	nd method blanks?		х	
7.3	Are more tha	n one of either fra	ction outside the acceptance cri	teria?		х		
7.4	If Yes in Sec	tion 7.3, are these	sample(s) or method blank(s) re	eanalyzed?			x	
7.5	If Yes in Sec	If Yes in Section 7.3, is any sample dilution factor greater than 10?						x
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.							
		> UCL	10% to LCL	< 10%				
	Positive	J	J	J		1		
	Non-detect	None	UJ	R		1		

Note:

Several surrogate analytes were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-S-2-SS-1.5	2FP, FBP, NBZ, PHL	21, 26, 0, 21	36-101 / 38-104 / 33-94 / 38-102
SA-S-2-SS-1.5RE	ТВР	13	27-124
SA-S-2-SB-4	2FP, FBP, NBZ, PHL, TBP, TPH	0, 0, 0, 0, 0, 0	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
SA-S-1-SS-0.5	2FP, FBP, NBZ, PHL	21, 26, 0, 23	36-101 / 38-104 / 33-94 / 38-102
SA-S-1-SS-0.5RE	ТВР	0	27-124
SA-S-1-SB-5	NBZ	95	33-94
SA-S-1-SB-5RE	2FP, PHL	31, 37	36-101 / 38-102
SA-S-1-WS-9	2FP, FBP, NBZ, PHL	32, 37, 29, 35	36-101 / 38-104 / 33-94 / 38-102
SA-S-1-WS-9RE	ТВР	0	27-124
AT-Q-20-SB-6	2FP, FBP, NBZ, PHL	19, 26, 0, 21	36-101 / 38-104 / 33-94 / 38-102
AT-Q-20-SB-6RE	ТВР	0	27-124
AT-Q-20-SS-1	2FP, FBP, NBZ, PHL	26, 34, 0, 25	36-101 / 38-104 / 33-94 / 38-102
AT-Q-20-SS-1RE	ТВР	0	27-124
SA-Q-1-SS-1	2FP, FBP, NBZ, PHL	20, 28, 0, 22	36-101 / 38-104 / 33-94 / 38-102
SA-Q-1-SS-1RE	2FP, PHL, TBP	30, 36, 13	36-101 / 38-102 / 27-124
SA-Q-1-SB-6	2FP, FBP, NBZ, PHL	18, 27, 0, 19	36-101 / 38-104 / 33-94 / 38-102
SA-Q-1-SB-6RE	ТВР	20	27-124
SA-Q-8-SS-0.5	2FP, FBP, NBZ, PHL	18, 22, 0, 18	36-101 / 38-104 / 33-94 / 38-102
SA-Q-8-SB-5	2FP, FBP, NBZ, PHL	15, 23, 0, 17	36-101 / 38-104 / 33-94 / 38-102

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP=2,4,6-Tribromophenol, TPH=Terphenyl-d14

Field ID	Analyte	Qualification	Code
SA-S-2-SS-1.5	All SVOCs	J/UJ	S
SA-S-2-SB-4	All SVOCs	J/R	S
SA-S-1-SS-0.5	All SVOCs	J/UJ	S
SA-S-1-WS-9	All SVOCs	J/UJ	S
AT-Q-20-SB-6	All SVOCs	J/UJ	S
AT-Q-20-SS-1	All SVOCs	J/UJ	S
SA-Q-1-SS-1	All SVOCs	J/UJ	S
SA-Q-1-SB-6	All SVOCs	J/UJ	S
SA-Q-8-SS-0.5	All SVOCs	J/UJ	S
SA-Q-8-SB-5	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x	,	
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		X	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			1
	require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Several analytes were outside QC limits for the MS/MSD sample AT-Q-20-SB-6, however the LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

 		Yes	No	_ NA
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		х	
	Action for specific compound outside the acceptance criteria: $R>UCL$, $J(+)$ only; LCL , $J(+)/UJ(-)$; $I(+)/R(-)$. RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			х

Note:

The LCS that had recoveries outside QC limits is associated with the reanalyzed samples. These samples were previously rejected, and do not require further qualification.

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal star	ndard area of every sample a	and blank within upper and I	ower QC limits for each continuing	ng calibration?		х	
		Area $> +100\%$	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R			,	
	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to					† · · · · · · · · · · · · · · · · · · ·	·	
Note:	continuing calib	oration. Thus, if all other QC	specifications are met for a	a given sample, using informed pr	ofessional judgment,			
	the reviewer may choose not to flag individual samples in this case.							
10.2	Are retention tin	nes of internal standards wit	thin 30 seconds of the assoc	iated calibration standard?		x		
	Action: The chr	romatogram must be examir	ned to determine if any false	positives or negatives exist. For	shift of a large			
				ta for non-detects in that sample/f				

Note:

Several internal standards were outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Internal Standard High/Low	Code
SA-S-2-SB-4DL	All SVOCs	J/UJ	Low	I
SA-S-1-WS-9	All detected SVOCs	J	High	I
AT-Q-20-SB-6	All detected SVOCs	J	High	I
SA-Q-1-SB-6	All detected SVOCs	J	High	I
SA-Q-8-SS-0.5	All detected SVOCs	J	High	I
SA-Q-8-SB-5	All detected SVOCs	J	High	I
AT-Q-21-SB-6	All detected SVOCs	J	High	I
AT-Q-21-WS-8	All detected SVOCs	J	High	I .
SA-S-2-SB-4	All detected SVOCs	Ј	High	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			Х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	V 20 A.		х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			X
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

13.0 Field Duplicate Samples (Code F)

<u> </u>		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-WS-8 was the parent sample for AT-Q-21-WS-8-D

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or	use 95% for aqueous sample, 90% for soil			
14.1	sample)		X		
14.2	Number of samples:	14			
14.3	Number of target compounds in each analysis:	65		-	
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer:

Date:

Bart Brandenburg

8/30/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Sauget - Area 2 21561511.60011

Project Number:

SAS 010

Review Level:

SDG No.:

SAS 010 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate, LCS, and MS/MSD recoveries.

Field IDs:

AT-Q-21-SB-6

AT-Q-21-WS-8

AT-Q-21-WS-8-D

SA-S-2-SB-4

SA-S-1-WS-9

AT-Q-20-SB-6

SA-Q-1-SB-6

SA-Q-8-SS-0.5

SA-Q-8-SB-5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the LCS, MS/MSD, and surrogate recoveries were outside QC limits

Although it is beyond the scope of this review, it should be noted that the CCV and ICAL had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ($> 10^{\circ}$ C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	Х		
3.2	Do any method blanks have positive results (TCL)?		X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

<u> </u>		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			Х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

· · · · · ·		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?		The state of the s	х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7.1	Are all sample	les listed on the ap	propriate Surrogate Recovery Su	ımmary Form ?		x		
7.2	Are surrogate	e recoveries within	acceptance criteria specified in	the QAPP for all samples?			х	
7.3	If No in Sect	ion 7.2, were these	sample(s) or method blank(s) re	eanalyzed?			х	
7.4	If No in Sect	ion 7.3, is any sam	ple dilution factor greater than 1	0? (Surrogate recoveries may be diluted	out.)	х		
	-	> UCL	10% to LCL	< 10%	·		<u> </u>	
	Positive	J	J	J				
	Non-detect	None	UJ	R				

Note: Several samples had the surrogate concentrations diluted out, several others had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	Surrogate recoveries	Surrogate Limits
SA-S-2-SB-4	All Pesticides	225 / 58	30-150 / 30-150
SA-Q-1-SB-6	All Pesticides	307 / 126	30-150 / 30-150
SA-Q-8-SB-5	All Pesticides	283 / 37	30-150 / 30-150

Field ID	Analyte	Qualification	Code
SA-S-2-SB-4	All Detected Pesticides	J	S
SA-Q-1-SB-6	All Detected Pesticides	J	S
SA-Q-8-SB-5	All Detected Pesticides	Ј	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		X	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample AT-Q-20-SB-6 was used as the MS/MSD sample. Several MS/MSD recoveries were outside QC limits for PCB analysis. The pesticide analysis had several analytes outside QC limits; however, all other QC was within criteria. Qualifications for PCB samples are listed below.

Field ID	Änalyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-20-SB-6	All PCBs	Low	30-130

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	All PCBs	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		X	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			1
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

Field ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-10717	All PCBs	Low	30-130

Field ID	Analyte	Qualification	Code
AT-Q-21-SB-6	All PCBs	J/UJ	L
SA-S-2-SB-4	All PCBs	. J/UJ	L
SA-Q-1-SB-6	All PCBs	J/UJ	L
AT-Q-21-WS-8	All PCBs	J/UJ	L
SA-S-1-WS-9	All PCBs	J/UJ	L
SA-Q-8-SS-0.5	All PCBs	J/UJ	Ļ
AT-Q-21-WS-8-D	All PCBs	J/UJ	L
AT-Q-20-SB-6*	All PCBs	J/UJ	L
SA-Q-8-SB-5	Ali PCBs	J/UJ	L

10.0 TCL Identification (Code W)

Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			Yes	No	NA
10.1	10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
	10.1	continuing calibration?			X

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			х
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			x

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?	x		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		l
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample AT-Q-21-WS-8-D was analyzed as the duplicate for AT-Q-21-WS-8.

13.0 Data Completeness

I			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
13.2	Number of samples:	. 9			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0		· · · · · · · · · · · · · · · · · · ·	
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100			

6 of 6

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

8/30/2005

Project Number:

Review Level:

21561510.60010

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 010 Level III

No samples were rejected.

Minor Anomalies:

Major Anomalies:

Samples were qualified based on the LCS and MS/MSD.

Field IDs:

AT-Q-21-SB-6	AT-Q-21-WS-8
SA-S-2-SS-1.5	SA-S-2-SB-4
SA-S-1-SB-5	SA-S-1-WS-9
AT-Q-20-SS-1	SA-Q-1-SS-1
SA-Q-8-SS-0.5	SA-Q-8-SB-5

AT-Q-21-WS-8-D

SA-S-1-SS-0.5 AT-Q-20-SB-6

SA-Q-1-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the LCS and MS/MSD recoveries were outside the QC limits.

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

[Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	Х		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
2.2	Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

_			Yes	No	NA.
L	3.1	Is a Method Blank Summary form present for each batch?	X		
L	3.2	Do any method blanks have positive results?	. 10 10 1 mg an annae conto	X	
	3.3	Do any field/rinse/equipment blanks have positive results?		X	
		Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
	3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A 1000 A		
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 12 hours?	Control of the Contro		х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all sampl	es listed on the app	propriate Surrogate Recovery Su	immary Form ?	×		1
6.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples?		х	
6.3	If No in Secti	on 6.2, were these	sample(s) or method blank(s) re	analyzed?		-	x
6.4	If No in Secti	on 6.3, is any sam	ple dilution factor greater than 1	0? (Surrogate recoveries may be diluted out.)	x		
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			<u> </u>
	Non-detect	None	UJ	R			<u> </u>

Note:

Several surrogate recoveries were outside QC limits due to dilutions. No qualification of data was required.

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample AT-Q-20-SB-6 was analyzed as the MS/MSD. The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-20-SB-6	Pentachlorophenol	-56 / -80	71-109

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	Pentachlorophenol	Ј	М

8.0 Laboratory Control Sample (LCS/LCSD) (Code L- LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-11350	Dichloroprop	76 / 110	48-96
LCS 680-11350	Pentachlorophenol	89 / 385	71-109

Field ID	Analyte	Qualification	Code
AT-Q-21-SB-6	Pentachlorophenol	J	L
AT-Q-21-WS-8	Pentachlorophenol	J	L
AT-Q-21-WS-8-D	Pentachlorophenol	Ј	L
SA-S-2-SB-4	Pentachlorophenol	J	L
SA-S-1-SS-0.5	Pentachlorophenol	J	L
SA-S-1-SB-5	Pentachlorophenol	J	L
SA-S-1-WS-9	Pentachlorophenol	J	L
AT-Q-20-SB-6*	Pentachlorophenol	J	L
SA-Q-1-SS-1	Pentachlorophenol	J	L
SA-Q-1-SB-6	Pentachlorophenol	J	L
SA-Q-8-SS-0.5	Pentachlorophenol	J	L
SA-Q-8-SB-5	Pentachlorophenol	J	L

9.0 TCL Identification (Code W)

[Yes	No	NA
0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
9.1	continuing calibration?			X
				<u> </u>

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			X
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations		X-10-10-10-10-10-10-10-10-10-10-10-10-10-	

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	x		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample AT-Q-21-WS-8-D was analyzed as the duplicate for AT-Q-21-WS-8.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)	10 T T T T T T T T T T T T T T T T T T T	 		
	% Completeness	100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
Date:	8/30/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 010
		Review Level:	Level III
Major Anomalies	3:		

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries, hold time criteria, and field duplicate RPDs.

Field IDs:	AT-Q-21-SB-6	AT-Q-21-WS-8	AT-Q-21-WS-8-D
	SA-S-2-SS-1.5	SA-S-2-SB-4	SA-S-1-SS-0.5
	SA-S-1-SB-5	SA-S-1-WS-9	AT-Q-20-SB-6
	AT-Q-20-SS-1	SA-Q-1-SS-1	SA-Q-1-SB-6
	SA-Q-8-SS-0.5	SA-Q-8-SB-5	

1.0 Chain of Custody/Sample Condition/Raw Data

			ICP		1	ICP-M			GFA/	4	CV	AA-I	.dg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	Х									x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X									х		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?										x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	X									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	Q86530135514800									X		

Note:

The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that holding times had been exceeded for mercury.

2.0 Holding Time (Code H) ICP ICP-MS GFAA CVAA-Hg No NA Yes No NA Yes No NA Yes Yes No NA Have any technical holding times, determined from date of collection to date of analysis, been 2.1 X X exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table. Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).

Note: One mercury sample exceeded method holding times. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
AT-Q-21-SB-6	Mercury	3	J	Н

3.0 Instrument	Calibration (Code C)		ICP		I	CP-M	[S		GFA.	1	CV	AA-l	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)			х									
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).												х
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.			х									х
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	37.35		х									x
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).			х									х
	Action: $R(+/-)$ $J(+)/UJ(-)$ $J(+)$ $R(+)$										Space		
	Mercury < 65% - 79% 121% - 135% > 135%				į.			95 95					
ļ	Other Metals < 75% 75% - 89% 111% - 125% > 125%	ار جائزوہ			18.72			CO.					

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X- Field blank failure)

			ICP		I	CP-M	1S	(GFA.	4	CV	'AA-l	Нg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per	70,200,000			17.00						x		
7.1	batch, per matrix and per level)?	X									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value		x			spickers							
4.2	are determined for positive and negative blank values.		X			Ĉ						Х	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to										X		
7.5	determine affect on the data note in reviewer narrative.	X									X		
	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours												
4.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on	X					1	4.02000			x		
· · · · · · · · · · · · · · · · · · ·	the data to note in reviewer narrative.										22.03%		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the												
4.5	blank value are determined for positive and negative blank values.		X									Х	
4.6	Are there samples with concentrations less than five times the highest level in associated		х										
4.0	blanks? Action: If yes, U at reported concentration.		.X									X	
4.7	Are there samples with non-detect results or with concentrations less than five times the most												
4.7	negative value in associated blanks? Action; If yes, J(+)/UJ(-).	<u> </u>	x						14.5			X	

Note:

5.0 IC	P Interfere	nce Check	Sample (ICS)	(Code N)					ICP	•	I	CP-M	1S		GFA.	A	CV	/AA-	Hg
								Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	5.1	Was ICS A	B analyzed at	beginning of ea	ch ICP run (or at	least twice every	8 hours), and at the												
L	3.1	beginning	or once every	8 hours (whiche	ver is more frequ	ent) for ICP-MS?	•			X									ľ
	5.2	Are the IC	S AB recoveri	es within 80% -	120%?	,		020/67		х									
	5.3	Are the res	ults for unspil	ked analytes (in	(CSA) < + IDL?			dis		х									
	5.4	If not, are ICS?	the associated	l sample Al, Ca,	Fe, and Mg cor	centrations less the	han the level in the			х									
		Action:	Not Spik	ed Analytes	Spiked	analytes (ICS AE	analytes)												
			< -IDL	> IDL	< 50%	50% - 79%	> 120%												
		<u>L</u>	UJ(-)	<u>J(+)</u>	R(+/-)	J(+)/UJ(-)	J(+)												

Laborator	y Control Samp	ole (LCS) (Co	de L - Recove	ery, Code E - R	PD)			ICP		I	CP-M	IS	(GFA.A	1	CVAA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA Yes	No	NA
6.1	Was an LCS	S prepared an	d analyzed at	the correct frequency	uency (one per 2	20 samples, per batch,							renniqui) il			1947	
0.1	per matrix as	nd per level)?	Action: If no	, J(+) any sampl	e not associated	with LCS results.	Х								X		
6.2	Is any LCS r	recovery outsi-	de the control	limits? (Aqueo	us limits: 80% -	120% - except Ag and											
0.2	Sb; Solid lin	nits: as per EP	A-EMSL/LV)					X					•			X	
	Action:	So	olid		Aqueous									47.00			
		< LCL	> UCL	< 50%	50% - 79%	> 120%		.00									
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)											

Note:

7.0 Labo	atory Duplicates (Code K)	ICP			ICP-		1S	(GFA.	4	C.	VAA-	Hg	
		Y	es	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one	per 20										13.573		
7.	samples, per batch, per matrix and per level)? Action: If no, J(+), with professional ju	dgment,	х									x		i l'
	analytes not associated with Duplicate results.													i l'
7.	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with prof	essional		x									980-04-14-1	
/·	judgment. Note in worksheet.		_ [X									X	i l'
7.	Are all analyte duplicate results within control? (RPD values < 20% or difference < ±	PQL for							in in the second					
/.	aqueous, and RPD < 35% or difference $\leq \pm 2$ X PQL for solids) Action: If no, J(+).		X						() () () ()			X		i
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.													

Note: Sample AT-Q-20-SB-6 was analyzed as the laboratory duplicate sample

8.0 Spike Samp	ole Analysis -Pre	-Digestion (Code M	- Recovery, Code D - RP	D)		ICP		I	CP-M	1S		GFA.	A	C	VAA-	Hg
						No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Was a spiked	sample prepared and	analyzed at the correct fre	quency (one per 20 samples, per							27					
8.1	batch, per mat	rix and per level)? A	Action: If no, J(+), with pro	ofessional judgment, analytes not	x						1500			x		l
		h matrix spike results														l
8.2	Was a field bl	ank used for the MS	analysis? Action: If yes,	J(+) with professional judgment.		х										
0.2	Note in works	heet.				X					İ				x	i
	Note: Matrix	spike analysis may	be performed on a field bl	ank when it is the only aqueous												
	sample in an S	DG.														
				ncentration, are spike recoveries				àssa								
8.3	within the con	trol limit of 75-125%	6? (No control limit applies	s to analytes with concentration >	Х				1					x		
	4 x spike conc	entration.)								l						i .
		%R > 125%	30% < %R < 74%	%R < 30%												
	Positive	J	J	J												
	Non-detect	None	UJ	R												

Note: Sample AT-Q-20-SB-6 was analyzed as the MS/MSD sample. Several recoveries were outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-20-SB-6	Antimony	51 / 53	75-125
AT-Q-20-SB-6	Copper	164 / 257	75-125
AT-Q-20-SB-6	Magnesium	129 / 143	75-125
AT-Q-20-SB-6	Potassium	155 / 175	75-125
AT-Q-20-SB-6	Zinc	122 / 166	75-125
AT-Q-20-SB-6	Mercury	166 / 86	80-120

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	Copper	Ĵ	M
AT-Q-20-SB-6	Magnesium	J	M
AT-Q-20-SB-6	Potassium	J	M
AT-Q-20-SB-6	Zinc	J	M
AT-Q-20-SB-6	Mercury	J	M

0 Instrument Detection Limits (IDL)			ICP		I	CP-M	1S	,	GFA.	Ą	C	VAA-	-Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			х									х
Note:													
0.0 ICP Seria	al Dilutions (Code S)		ICP		I	CP-M	IS		GFA.	Ą	C	VAA-	-Hg
0.0 ICP Seria		Yes		NA	Yes			Yes			C' Yes	_	Hg NA
10.1	Were serial dilutions performed?	Yes		NA	<u> </u>							_	
		4		NA	<u> </u>							_	
10.1	Were serial dilutions performed?	X		NA	<u> </u>							_	

Note: Sample AT-Q-20-SB-6 was analyzed as the serial dilution sample.

11.0 Field Dup	licate Samples (Code F)		ICP ICP-MS		ICP-MS			GFAA			/AA-l	Hg	
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	х							-		X	ГТ	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < + 2 x POL and for solids RPD < 100% or difference < + 4 x POL)		x								x		

Note: Sample AT-Q-21-WS-8-D was analyzed as the duplicate for AT-Q-21-WS-8. One analyte was outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
AT-Q-21-WS-8	Calcium	J	F
AT-Q-21-WS-8-D	Calcium	J	F

12.0 Result Verification (Code Q)			ICP ICP-		ICP-MS GFAA		1	CVAA-Hg		-Ig			
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									x
12.2	Were all dilution reflected in the positive results and detection limits?	Mad at		х	ansylveryper S								х
Note													

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for						
	aqueous sample, 90% for soil sample)		l				
13.2	Number of samples:	14		0	0		14
13.3	Number of target compounds in each analysis:	22		0	0	-	1
13.4	Number of results rejected and not reported:	0	1	0	0		0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$						
	% Completeness	100		####	####		100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer: Bart Brandenburg Project Name: Sauget - Area 2 8/30/2005 Date: Project Number: 21561510.60011 Laboratory Severn Trent Laboratory - Savannah SAS 010 SDG No.: Test Name: Ammonia Level III Review Level: Method No.: 350.1

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries

Field IDs:	AT-Q-21-SB-6	AT-Q-21-WS-8	AT-Q-21-WS-8-D
	SA-S-2-SS-1.5	SA-S-2-SB-4	SA-S-1-SS-0.5
	SA-S-1-SB-5	SA-S-1-WS-9	AT-Q-20-SB-6
	AT-Q-20-SS-1	SA-Q-1-SS-1	SA-Q-1-SB-6
	SA-O-8-SS-0 5	SA-O-8-SR-5	

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		х	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		х	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		-	
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 10 samples?			х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			· ·

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AT-Q-20-SB-6 was spiked and analyzed as the MS/MSD. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-20-SB-6	Ammonia	75/73 / 3	75-125 / 30

Field ID	Analyte	Qualification	Code
AT-Q-20-SB-6	Ammonia	UJ	М

7.0 Laboratory Control Sample (LCS/LCSD) (Code I - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x	-	
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

8.0 Analyte Identification

		Yes	No	NA
	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT			
8.1	in the continuing calibration?			x

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			х
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			х

Note:

10.0 Field Duplicate Samples (Code F)

	•	Yes	No	NA
10.1	Were any field duplicates submitted?		х	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-21-WS-8-D was submitted and analyzed as the field duplicate sample for AT-Q-21-WS-8.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		х	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			х
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			х

Note:

12.0 Data Completeness

	· · · · · · · · · · · · · · · · · · ·		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or sample)	use 95% for aqueous sample, 90% for soil	X		
12.2	Number of samples:	14			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0	†		
ļ	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100	1		

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

8/19/2005

Project Number:

Review Level:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 011 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

AA-CLAY-1-66

AA-CLAY-1-86

AA-0-4-102

AA-0-4-119

AA-CLAY-1-106

AA-CLAY-1-119

AA-P-4-22

AA-P-4-42

AA-P-4-62

AA-P-4-62-D

TB-11

1.0 Chain of Custody/Sample Condition

 		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservat	ion, collection and stor	rage condition meet me	ethod requirement?	x		
	temperature is outsid		frozen) to 10° flag al	<2°>6°C, etc.), comment in report. If unpreserved or I positive results with a "J" and all non-detects "UJ". If ects "R".			
2.2	Have any technical h	olding times, determin	ned from sampling to d	ate of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 °C ± 2 °C	14 days	14 days			
2.3	Have any technical h	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).				X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			х

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	<u> </u>	X	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".		-	
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			Х

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			Х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		-	х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.		000000000000000000000000000000000000000	x

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				x		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples?	X		
7.3	If No in Sect	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					х
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					х	
		Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.					
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			<u> </u>

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	7 (1) (1) (2) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AA-0-4-119 was used as the MS/MSD sample.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X	***	† · · · · · · · · ·
9.4	If Level IV, verify the % recoveries are calculated correctly.		•	X
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal stan	dard areas for every sample	and blank within upper and	lower QC limits?	X		
•		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	continuing calibr		specifications are met for a	d to the mid-point initial calibratio given sample, using informed pro s case.			
10.2	Are retention tim	nes of internal standards with	in 30 seconds of the associ	ated calibration standard?	x		
				positives or negatives exist. For slag for non-detects in that sample/fra			

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
11.1	calibration?			l X
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
11.2	do sample and standard relative ion intensities agree within 30%?			X

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			X
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	100		X
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations.			X

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample AA-P-4-62 was the parent sample to AA-P-4-62-D

14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)			
14.2	Number of samples: 11			
14.3	Number of target compounds in each analysis: 33			
14.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$			
	% Completeness 100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Review Level:

Sauget - Area 2

Date:

8/19/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 011 Level III

Major Anomalies:

Samples were rejected based on holding times.

Minor Anomalies:

Samples were qualified based on internal standard and surrogate recoveries.

Field IDs:

AA-CLAY-1-66

AA-CLAY-1-86

AA-0-4-102

AA-O-4-119

AA-CLAY-1-106

AA-CLAY-1-119

AA-P-4-22

AA-P-4-42

AA-P-4-62

AA-P-4-62-D

1.0 Chain	of Custoc	dy/Sample Condition	Yes	No	NA
	1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
	1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	х		

Note:

The MS/MSD, internal standards, and surrogates had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

			Yes	No	NA
	2.1	Do sample preservation, collection and storage condition meet method requirement?	Х		
		If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
-		elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
	2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
	2.2	Time Table for sample holding time) If yes, J(+)/UJ(-).	X		
		Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			•
	2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Samples were re-extracted outside holding time criteria.

Field ID	Analyte	Days outside Hold time	Qualification	Code
AA-CLAY-1-86RE	All SVOC Analytes	25	R	Н
AA-CLAY-1-86REDL	All SVOC Analytes	. 25	R	Н
AA-0-4-102RE	All SVOC Analytes	25	R	Н
AA-0-4-102REDL	All SVOC Analytes	25	R	Н
AA-P-4-22RE	All SVOC Analytes	25	R	Н
AA-P-4-42RE	All SVOC Analytes	25	R	Н
AA-P-4-62RE	All SVOC Analytes	25	R	Н

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

4.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

			Yes	No	NA
4	4.1	Is a Method Blank Summary form present for each batch?	X		
4	4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	х		
2	4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		Х	
		Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U"			
		and the detection limit elevated to the RL for estimate concentrations.			
	4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

One analyte was detected in the method blank; however, all associated samples were non-detect for that analyte. No qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.		2.0	х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			х

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag in	R.		
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.	†		х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.		1. N. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	

7.0 Surrogate Recovery (Code S)

Note:

						Yes	No	NA
7.1	Are all samp	les listed on the ap	propriate Surrogate Recovery S	ummary Form ?		X		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all sample	es and method blanks?		x	
7.3	Are more than	n one of either fra	ction outside the acceptance crit	eria?		х		
7.4	If Yes in Sect	ion 7.3, are these	sample(s) or method blank(s) re	analyzed?			x	
7.5	If Yes in Sect	If Yes in Section 7.3, is any sample dilution factor greater than 10?						x
			y unacceptable recoveries in the assessed separately.	e MS and/ or diluted sam	nples, then no reanalysis is required			
		> UCL	10% to LCL	< 10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				

Several surrogate recoveries were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate limits
AA-CLAY-1-86	2FP	221	56-100
AA-0-4-102	2FP, FBP, NBZ, PHL, TBP	42, 43, 45, 42, 47	56-100, 59-103, 60-102, 55-104, 55-126
AA-0-4-119	2FP	167	56-100
AA-P-4-22	2FP, FBP, NBZ, PHL	22, 54, 52, 12	56-100, 59-103, 60-102, 55-104
AA-P-4-42	2FP, FBP, NBZ, PHL	22, 56, 51, 12	56-100, 59-103, 60-102, 55-104
AA-P-4-62	2FP, FBP, NBZ, PHL	18, 43, 42, 10	56-100, 59-103, 60-102, 55-104
AA-P-4-62-D	2FP, PHL	53, 43	56-100, 55-104

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP=2,4,6-Tribromophenol

Field ID	Analyte	Qualification	Code
AA-0-4-102	All SVOCs	J\N1	S
AA-P-4-22	All SVOCs	J/UJ	S
AA-P-4-42	All SVOCs	J/UJ	S
AA-P-4-62	All SVOCs	J/UJ	S
AA-P-4-62-D	All Acid fraction analytes	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample AA-0-4-119 was used as the MS/MSD sample. Several analytes were outside QC limits for the MS/MSD sample, however the LCS was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td>Constitution of the Constitution of the Consti</td><td></td><td></td></lcl,>	Constitution of the Consti		
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note:

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal stan	dard area of every sample a	nd blank within upper and le	ower QC limits for each cont	inuing calibration?		x	
		Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				i
	Non-detect	None	UJ	R				
Note:	continuing calib	cification is for the continuir ration. Thus, if all other QC viewer may choose not to fla	specifications are met for a	given sample, using informe	ibration, not sample to ed professional			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?					X		
	Action: The chr magnitude, the r	omatogram must be examine eviewer may consider partia	ed to determine if any false or total rejection of the dat	positives or negatives exist. a for non-detects in that sam	For shift of a large ple/fraction.			

Note:

One sample had several internal standards outside QC limits. Qualifications are listed below.

Field ID	Analyte	IS Recoveries High/Low	Qualifications	Code
AA-CLAY-1-86	All SVOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

	<u> </u>		Yes	No	NA
1	12.1	Are RLs used consistent with those specified in the QAPP?			х
1	12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
1	12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
1	12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
1	12.5	If Level IV, calculate a sample of positive results to verify correct calculations		7.1	х

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AA-P-4-62 was the parent sample for AA-P-4-62-D

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use sample)	e 95% for aqueous sample, 90% for soil	X		
14.2	Number of samples:	10			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Laboratory

Date:

Bart Brandenburg

8/19/2005

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60010

SAS 011 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on field duplicate differences.

Field IDs:

AA-CLAY-1-66

AA-CLAY-1-86

AA-0-4-102

AA-0-4-119

AA-CLAY-1-106

AA-CLAY-1-119

AA-P-4-22

AA-P-4-42

AA-P-4-62

AA-P-4-62-D

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1 2	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			
1.3	samples, analytical problems or special circumstances affecting the quality of the data?	X		İ

Note:

The laboratory case narrative and cooler receipt form indicated no problems.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	Х		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".	•		
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
2.2	Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			x

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			X

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			Х

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the a	ppropriate Surrogate Recovery Su	ımmary Form ?	X		
6.2	Are surrogate recoveries withi	n acceptance criteria specified in	the QAPP for all samples?	X		
6.3	If No in Section 6.2, were thes	e sample(s) or method blank(s) re	eanalyzed?			x
6.4	If No in Section 6.3, is any sar	nple dilution factor greater than 1	0? (Surrogate recoveries may be diluted or	ıt.)		x
	> UCL	10% to LCL	< 10%		, , , , , ,	† ·
	Positive J	J	J			· · · · · ·
	Non-detect None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		·	х
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			х
•	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
9.1	continuing calibration?			X

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

,,		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			х

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	X		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		х	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample AA-P-4-62 was the parent sample for AA-P-4-62-D. The sample and duplicate sample had %RPD outside QC limits for one analyte. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
AA-P-4-62	МСРР	J	F
AA-P-4-62-D	МСРР	J	F

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP of sample)	x			
12.2	Number of samples: 10				
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0		• •	
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)		-	-	
	% Completeness	100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2	
Date:	8/19/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 011	
		Review Level:	Level III	
Major Anom	nalies:			
	No samples were rejected			
Minor Anom				
	No samples required qualification			
Field IDs:	AA-CLAY-1-66	AA-CLAY-1-86	AA-0-4-102	
	AA-0-4-119	AA-CLAY-1-106	AA-CLAY-1-119	
	AA-P-4-22	AA-P-4-42	AA-P-4-62	
	AA-P-4-62D			

1.0 Chain of Custody/Sample Condition/Raw Data

			ICP		10	ICP-MS		_		GFAA		/AA-	-Hg	
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA	
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	Х									X			
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X									X			
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X									X		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	x									X			
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.										Х			

Note: The laboratory case narrative and cooler receipt form indicated no discrepancies.

2.0 Holding Time (Code H)

			ICP			ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP		ICP-MS		ICP-MS			GFAA		CVAA-Hg		Ig
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA																																																													
	2.1	Have any technical holding times, determined from date of collection to date of analysis, been		v			Security .			255	\Box																																																																
1	2.1	exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		X				İ					X	ĺ																																																													
		Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)					1					. 8	7745																																																														
L		J(+)/R(-).							1																																																																		

3.0 Instrument Calibration (Code C)

							ICP		I(CP-M	IS	•	GFA.	4	C	/AA-	Hg
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand			,	blank + one standard;			х									
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and G	CVAA) Action: J(+)/UJ(-).												X
3.3	Was an initial calibration If no, use professional judg							x									x
3.4	Was continuing calibratio whichever is more frequen data and note in reviewer r	it? Action: 1		•	•	S0000000 £ 5000000		x									x
3.5	Are all calibration standard (80%-120%) and other Me			CCV) within the co	ntrol limits? Mercury			х									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)	1 m											
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%				##4								
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%												

Note:

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

	·		ICP		I	CP-M	1S	(GFA/	١	CV	'AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	х									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	,	X									x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										X	-
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		X									x	

5.0 ICP Interference Check Sample (ICS) (Code N)

								ICP		IC	CP-M	IS	(GFA.	1	CV	/AA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS A	B analyzed a	t beginning of e	ach ICP run (or	at least twice eve	ry 8 hours), and at the												
3.1	beginning of	or once every	8 hours (whiche	ver is more frequ	ent) for ICP-MS?				*									
5.2	Are the ICS	S AB recoveri	es within 80% -	120%?					х									
5.3	Are the resi	ults for unspik	ced analytes (in l	ICS A) < + IDL?				·	x									
5.4	If not, are t	he associated	sample Al, Ca, I	Fe, and Mg conce	entrations less than	the level in the ICS?			х									
	Action:	Not Spik	ed Analytes	Spiked	analytes (ICS AF	analytes)												
		< -IDL	> IDL	< 50%	50% - 79%	> 120%												
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

				ICP		I	CP-M	1S		GFA.	4	CV	AA-I	Ig
_			Yes	No	NΑ	Yes	No	NA	Yes	No	NA	Yes	No	NA
Γ	6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per	r											
\mathbb{L}		matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X						207			X		
	6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and St	;	x										
	0.2	Solid limits: as per EPA-EMSL/LV)	1	X									Ж	
		Action: Solid Aqueous								1.00				
		< LCL > UCL < 50% 50% - 79% > 120%												
<u>L</u>		J(+)/UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

			ICP		I	CP-M	1S		GFA.	1	CV	AA-I	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,								100				
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	x						100			x		
	associated with Duplicate results.			İ			ļ						
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional		x			8,00							
7.2	judgment. Note in worksheet.		X								į.	X	
7.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for												
/.5	aqueous, and RPD < 35% or difference $\leq \pm 2$ X PQL for solids) Action: If no, J(+).	X									Х	ı	
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.]	1						

3 of 5

Note: Sample AA-0-4-119 was used as the laboratory duplicate.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

						ICP		I(CP-M			GFA.			/AA-	Hg
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Was a spiked	sample prepared and	d analyzed at the correct fr	requency (one per 20 samples, per												
8.1	batch, per mat	rix and per level)?	Action: If no, J(+), with p	professional judgment, analytes not	x	ł.								X		l
	associated with	matrix spike results														l
8.2	Was a field bl	ank used for the M	S analysis? Action: If yes	s, J(+) with professional judgment								93340			V	
0.2	Note in worksh					X									Ж	
	Note: Matrix s	spike analysis may be	performed on a field blank	when it is the only aqueous sample	;											
	in an SDG.															
				tration, are spike recoveries within												
8.3	the control lim	it of 75-125%? (No	control limit applies to anal	lytes with concentration > 4 x spike	X									x		
	concentration.)	•														
		R > 125%	30% < %R < 74%	%R < 30%												
	Positive	J	J	J												
L	Non-detect	None	UJ	R												

Sample AA-0-4-119 was used as the MS/MSD sample. Note:

0.0 Instrument Detection Limits (IDI)

9.0 Instrun	nent Detection Limits (IDL)												
			ICP		I	CP-M	1S		GFA.	4	C/	/AA-I	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			х									х
Note:													
10.0 ICP S	erial Dilutions (Code S)						•						
			ICP	·	I	CP-M	IS		GFA.	4	C\	/AA-I	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	х			25,578.60							\Box	
10.2	Was a five-fold dilution performed?	X											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the	2											
10.5	original sample? If no. I(+).	X				1				١٠		i I	

Sample AA-0-4-119 was diluted and analyzed as the serial dilution sample. Note:

original sample? If no, J(+).

11.0 Field Duplicate Samples (Code F)

11.0 Field Duplicate Samples (Code F)			ICP		I'	CP-IV	15		JFA/	4	CV	AA-I	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1 Were any field duplicates submitted f	or metal analysis?	X			0.5000000 8.000000000						X		
	n control? (For aqueous sample, RPD values < 50% or RPD < 100% or difference $< \pm 4 \times PQL$)	X									X		

Note: Sample AA-P-4-62 was the parent sample for AA-P-4-62-D.

12.0 Result Verification (Code Q)

			ICP		I	CP-M	1S	(GFA.	4	CV	/AA-l	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									х
12.2	Were all dilution reflected in the positive results and detection limits?			x									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous				
13.1	sample, 90% for soil sample)				
13.2	Number of samples:	10	0	0	10
13.3	Number of target compounds in each analysis:	22	0	0	1
13.4	Number of results rejected and not reported:	0	0	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100	####	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Date:

Bart Brandenburg

8/19/2005

Laboratory Test Name:

Method No.:

Ammonia

350.1

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 011

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries.

Field IDs:

AA-CLAY-1-66 AA-0-4-119

AA-P-4-22

AA-P-4-62-D

Severn Trent Laboratory - Savannah

AA-CLAY-1-86

AA-CLAY-1-106

AA-P-4-42

AA-0-4-102

AA-CLAY-1-119

AA-P-4-62

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the MS/MSD had recoveries outside OC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
,	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	-	X	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

			Yes	No	NA
	3.1	Is a Method Blank Summary form present for each batch?	X		
	3.2	Do any method blanks have positive results?	x		
	3.3	Do any field/rinse/equipment blanks have positive results?		X	
		Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
L	3.4	If Level IV, review raw data and verify all detections for blanks were reported.			х

Note:

The method blank sample was reported above the MDL; however, all associated samples were greater than 5X the blank concentration. No qualification of data was required.

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			<u> x</u>

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?		en e	х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			X

Note: Sample AA-0-119 was used as the MS/MSD sample.

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD recoveries	MS/MSD limits
AA-0-4-119	Ammonia	42/41 / 1	90-110 / 30

Field ID	Analyte	Qualification	Code
AA-0-4-119	Ammonia	J	m

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	-X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			X
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

8.0 Analyte Identification

		Yes	No	NA
R 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in			
0.1	the continuing calibration?			X

Note:

9.0 Analyte Quantitation and Reported Detection limits

х
x
x
1 x

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample AA-P-4-62 was the parent sample to AA-P-4-62-D

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, $J(+)$, with professional judgment, analytes not associated with duplicate results.			х
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			х
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			X

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use	95% for aqueous sample, 90% for soil	x		
	sample)		X		
12.2	Number of samples:	10			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100			

			•	

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:

Amelia Turnell

Date:

10/10/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.: Review Level: Sauget - Area 2

21561510.60011

SAS 012 Level III

Major Anomalies:

Analytes were rejected as mentioned below.

Minor Anomalies:

Samples required qualifications.

Field IDs:

SA-Q-15-SS-0.5	SA-Q-13-SB-2	SA-Q-11-SS-0.5
SA-Q-15-SB-2	AT-Q-21-SS-1	SA-Q-11-SB-2
SA-Q-14-SS-0.5	AT-Q-21-SS-1-D	SA-Q-9-SS-0.5
SA-Q-14-SB-5	AT-Q-19-SB-6	SA-Q-9-SB-5
SA-Q-13-SS-1	AT-Q-19-SB-6-D	SA-Q-9-SB-5-D
SA-Q-10-SB-2	SA-Q-10-SS-0.5-D	SA-Q-10-SS-0.5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	***************************************	X	

Note:

The laboratory case narrative indicated that a few hold times were exceeded for confirmation of results. A few surrogates and a few MS/MSD recoveries were outside control limits. One compound in one LCS was recovered low. Multiple internal standards were recovered low outside quality control limits for various samples. One sample was analyzed at a secondary dilution due to abundance of target analytes. Although it is beyond the scope of this review, it should be noted that the CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservat	ion, collection and stor	age condition meet me	ethod requirement?	X		
	If sample preservation and/or temperature was inappropriate (i.e., $<2^{\circ}>6^{\circ}$ C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10° , flag positive detections "J" and non-detects "R".						
2.2	Have any technical h	olding times, determin	ed from sampling to d	ate of analysis, been exceeded? If yes, J(+)/UJ(-	-). x		
	Matrix	Preserved	Aromatic	All others	, <u>, , , , , , , , , , , , , , , , , , </u>		
	Aqueous	No	7 days	14 days		+	
		Yes	14 days	14 days		1	
	Soil/Sediment	4 °C ± 2 °C	14 days	14 days	· · · · · · · · · · · · · · · · · · ·		·
2.3	Have any technical h	olding times been gros	ssly (twice the holding	time) exceeded? If yes, J(+)/R(-).	· · · · · · · · · · · · · · · · · · ·	x	

Note:

Samples AT-Q-21-SS-1 RA, AT-Q-21-SS-1-D RA, AT-Q-19-SB-6 RA and AT-Q-19-SB-6-D RA were reanalyzed outside holding times.

Qualifications are listed below.

Days Late	Field ID	Analyte	Qualification	Code
4	AT-Q-21-SS-1 RA	All VOCs	detects J/ non-detects UJ	Н
4	AT-Q-21-SS-1-D RA	All VOCs	only non-detects, therefore, only UJ	Н
4	AT-Q-19-SB-6 RA	All VOCs	detects J/ non-detects UJ	Н
4	AT-Q-19-SB-6-D RA	All VOCs	detects J/ non-detects UJ	Н

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	***		x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			Y
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			Y
Motor			<u> </u>	<u> </u>

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		·	Yes	No	NA
	4.1	Is a Method Blank Summary form present for each batch?	x		
	4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
1	4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?			x
		Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
		butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate			
		(laboratory "J" flagged) concentrations.			
	4.4	If Level IV, review raw data and verify all detections for blanks were reported.			Y
	Milata				

Note:

5.0 GC/MS Initial Calibration (Code C)

	Yes	No	NA
Are Initial Calibration summary forms present and complete for each instrument used?			X
Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			X
Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor			
responders like ketones or alcohols)? If yes, J(+)/R(-).			х
Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	(0.0 data of 2000 to 2000)		X
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R". Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-). Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	Are Initial Calibration summary forms present and complete for each instrument used? Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990? If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R". Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-). Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	Are Initial Calibration summary forms present and complete for each instrument used? Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990? If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R". Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-). Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			<u>x</u>
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			X
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag		98494 ₆ 2 , 5571888833	
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

7.0 Surrogate Recovery (Code S)

							Yes	No	NA
	7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?					X		
	7.2 Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?					x			
	7.3	If No in Secti	on 7.2, were these	were these sample(s) or method blank(s) reanalyzed?					-
	7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)					х		
		Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no							
		reanalysis is r	equired.						
1			> UCL	10% to LCL	< 10%				
]		Positive	J	J	J				
		Non-detect	None	UJ	R				

Note:

Several samples had surrogate recoveries outside QC limits. Qualifications are listed below. The diluted sample SA-Q-10-SS-0.5-D DL surrogate recoveries were within control limits.

Sample ID	Surrogate recoveries	Surrogates	Surrogate Limits
AT-Q-21-SS-1	48	BFB	68-121
AT-Q-21-SS-1 RA	0 / 155	BFB/DBFM	68-121 / 66-127
AT-Q-21-SS-1-D	54	BFB	68-121
AT-Q-21-SS-1-D RA	0 / 147 / 63	BFB / DBFM / TOL	68-121 / 66-127 / 65-128
AT-Q-19-SB-6	51	BFB	68-121
AT-Q-19-SB-6 RA	62	BFB	68-121
AT-Q-19-SB-6-D	38	BFB	68-121
AT-Q-19-SB-6-D RA	0	BFB	68-121
SA-Q-10-SB-2	65	BFB	68-121
SA-Q-10-SB-2 RE	67	BFB	68-121

BFB=4-Bromofluorobenzene DBFM=Dibromofluoromethane TOL=Toluene-d8

Sample ID	Analytes	Qualification	Code
AT-Q-21-SS-1	All VOCs	J/UJ	S
AT-Q-21-SS-1 RA All VOCs		J/R These R qualifiers supersede UJ qualifiers assigned due to holding times.	S
AT-Q-21-SS-1-D	All VOCs	J/UJ	S
AT-Q-21-SS-1-D RA	All VOCs	R These R qualifiers supersede UJ qualifiers assigned due to holding times.	S
AT-Q-19-SB-6	All VOCs	J/UJ	S
AT-Q-19-SB-6 RA	All VOCs	J/UJ	S
AT-Q-19-SB-6-D	All VOCs	J/UJ	S
AT-Q-19-SB-6-D RA	All VOCs	J/R These R qualifiers supersede UJ qualifiers assigned due to holding times.	S
SA-Q-10-SB-2 All VOCs		J/UJ	S
SA-Q-10-SB-2 RE	All VOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

I		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		X	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Samples SA-Q-13-SS-1 and SA-Q-15-SB-2 were the MS/MSD client designated samples. The MS/MSD recoveries in sample SA-Q-13-SS-1 were high for 1,2-dichloroethane, bromodichloromethane, 2-hexanone, 4-methyl-2-pentanone and styrene. The MSD recoveries in sample SA-Q-15-SB-2 were high for acetone, 1,2-dichloroethane, benzene, 2-hexanone and 4-methyl-2-pentanone. The MS/MSD recoveries for styrene were slightly low (71 & 70, 80-118). RPDs were within acceptance criteria for both MS/MSD samples. Qualifications were not made based on MS/MSD alone and the LCS recoveries for these two samples were within QC limits. No qualification of data were required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		X	
9.4	If Level IV, verify the % recoveries are calculated correctly.			х
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

Note: Two LCS

Two LCS samples had percent recoveries out of criteria.

Sample ID	LCS recovery and ranges	Related Samples	Qualifiers Assigned	Code
680-11861/2	2-Butanone, 21, 30-149	SA-Q-11-SS-0.5	UJ	L
	same	SA-Q-11-SB-2,	UJ	L
	same	SA-Q-9-SS-0.5	J	L
	same	SA-Q-9-SB-5	UJ	L
	same	SA-Q-9-SB-5-D	UJ	L
	same	SA-Q-10-SS-0.5	J	L
	same	SA-Q-10-SS-0.5-D	J	L
	same	SA-Q-10-SB-2	UJ	L
	same	SA-Q-10-SB-2 RA	J	L
680-13213/2	Methylene chloride. 40, 54-150	SA-Q-10-SS-0.5-D DL	UJ	L
	Acetone, 8, 28-143	SA-Q-10-SS-0.5-D DL	R	L
	2-Hexanone 28, 30-148	SA-Q-10-SS-0.5-D DL	UJ	L

10.0 Internal Standards (Code I)

			<u> </u>			Yes	No	NA
10.1	Are internal star	idard areas for every sample	and blank within upper and	lower QC limits?			X	
		Area $> +100\%$	Area < -50%	Area < -10%				
	Positive	Ĵ	J	J				
	Non-detect	None	UJ	R				
	The method spe-	cification is for the continuir	g calibration to be compare	d to the mid-point initial calibrate	tion, not sample to		-	
Note:				given sample, using informed p				
		viewer may choose not to fla						:
10.2	Are retention tin	nes of internal standards with	nin 30 seconds of the associ	ated calibration standard?		X	•	
	Action: The chr	omatogram must be examine	ed to determine if any false p	positives or negatives exist. For	shift of a large			
				a for non-detects in that sample/				

Note: There are several internal standards in different samples that are outside of criteria. Qualifications are listed below.

Sample ID	Internal Standards Area	Internal Standards	Lower and Upper Limits
AT-Q-21-SS-1	25045 / 34137 / 7582	DCA/ DFB/ CBZ	55688 - 222750 / 71536 - 286142 / 50530 - 202120
AT-Q-21-SS-1-D	23972 / 35772 / 7735	DCA/ DFB/ CBZ	55688 - 222750 / 71536 - 286142 / 50530 - 202120
AT-Q-19-SB-6	26597	CBZ	50530 - 202120
AT-Q-19-SB-6-D	40205 / 8315	DFB/ CBZ	71536 - 286142 / 50530 - 202120
SA-Q-10-SS-0.5-D	61558	CBZ	66066 -264266
SA-Q-10-SB-2	50781	CBZ	66066 -264266
SA-Q-10-SB-2 RA	100415 / 24045	DFB/ CBZ	165455 - 661820 / 66066 - 264266
AT-Q-21-SS-1 RA	3601 / 6452 /1171	DCA/ DFB/ CBZ	48304 - 193214 / 66378 - 265512 / 45964 - 183856
AT-Q-21-SS-1-D RA	3946 / 7238 / 1104	DCA/ DFB/ CBZ	48304 - 193214 / 66378 - 265512 / 45964 - 183856
AT-Q-19-SB-6 RA	27563 / 38623 / 12620	DCA/ DFB/ CBZ	48304 - 193214 / 66378 - 265512 / 45964 - 183856
AT-Q-19-SB-6 D RA	20624 /4004 / not available	DCA/ DFB/ CBZ	48304 - 193214 / 66378 - 265512 / 45964 - 183856

DCA = 1,2-Dichloroethane

DFB = 1,4-Difluorobenzene

CBZ = Chlorobenzene

Sample ID	Analytes	Qualification	Code
AT-Q-21-SS-1	All VOCs	Already J/UJ due to S	I
AT-Q-21-SS-1-D	All VOCs	Already J/UJ due to S	I
AT-Q-19-SB-6	All VOCs	Already J/UJ due to S	I
AT-Q-19-SB-6-D	All VOCs	Already J/UJ due to S	I
SA-Q-10-SS-0.5-D	All VOCs	J/UJ	Ι
SA-Q-10-SB-2	All VOCs	Already J/UJ due to S	I
SA-Q-10-SB-2 RA	All VOCs	Already J/UJ due to S	I
AT-Q-21-SS-1 RA	All VOCs	Already J/R due to S	Ι
AT-Q-21-SS-1-D RA	All VOCs	Already R due to S	I
AT-Q-19-SB-6 RA	All VOCs	Already J/UJ due to S	. I
AT-Q-19-SB-6 D RA	All VOCs	Already J/R due to S	I

11.0 TCL Identification (Code W)

<u> </u>			Yes	No	NA
	11 1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
		continuing calibration?			x
	11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
	11.2	do sample and standard relative ion intensities agree within 30%?			X

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA.
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			X
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			X

13.0 Field Duplicate Samples (Code F)

12.1 Works one field developed and will be a VOC and will be		
13.1 Were any field duplicates submitted for VOC analysis?	İ	
Were all RPD or absolute difference values within the control limits outlined in the QAPP?	х	
Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		

Note:

Sample AT-Q-21-SS-1 was the parent sample to AT-Q-21-SS-1-D and sample AT-Q-19-SB-6 was the parent to AT-Q-19-SB-6 D. Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.

Trichloroethene and tetrachloroethene had high RPD and absolute difference outside control limits in samples SA-Q-10-SS-0.5 and

0.5-D; therefore qualifiers were assigned accordingly.

Sample ID	Analytes	Reason for Qualifier	Qualifiers Assigned	Code
SA-Q-10-SS-0.5	Trichloroethene 28 ug/kg	103 % RPD	J	F
SA-Q-10-SS-0.5-D	Trichloroethene 87 ug/kg	103 % RPD	Already qualified J due to I	F
SA-Q-10-SS-0.5	Tetrachloroethene 140 ug/kg	difference >2xs the RL	J	F
SA-Q-10-SS-0.5-D	Tetrachloroethene 550 ug/kg D	difference >2xs the RL	J	F

14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil			
14.1	sample)	X		
14.2	Number of samples: 18			
14.3	Number of target compounds in each analysis: 33			
14.4	Number of results rejected and not reported: 4			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)			
	% Completeness 99.3			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Date:

Amelia Turnell

10/12/2005

Laboratory Severn T

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS012

Level III

Major Anomalies:

Reanalysis results of one sample were qualified rejected due to missed holding times.

Minor Anomalies:

Several samples were qualified due to surrogate recoveries outside QC limits and method blank detections.

Field IDs:

SA-Q-15-SS-0.5	SA-Q-13-SB-2	SA-Q-11-SS-0.5
SA-Q-15-SB-2	AT-Q-21-SS-1	SA-Q-11-SB-2
SA-Q-14-SS-0.5	AT-Q-21-SS-1-D	SA-Q-9-SS-0.5
SA-Q-14-SB-5	AT-Q-19-SB-6	SA-Q-9-SB-5
SA-Q-13-SS-1	AT-Q-19-SB-6-D	SA-Q-9-SB-5-D
SA-Q-10-SB-2	SA-Q-10-SS-0.5-D	SA-Q-10-SS-0.5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated detections in a few method blanks. Some surrogates, LCSs and MS/MSDs recoveries were outside the quality control limits. One sample was re-extracted and reanalyzed outside holding time.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	х		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	х		

Note:

Sample SA-Q-11-SS-0.5 RE was re-extracted 30 days outside the holding time. Therefore, these results were rejected.

Field ID	Analyte	Qualification	Code
SA-Q-11-SS-0.5 RE	All SVOC analytes	R	Н

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?		***	Х
3.2	Have all samples been analyzed within twelve hours of the tune?		-	Х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	X		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?			X
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: A few compounds were detected in the method blanks.

Field ID	Analyte	Qualification	New RL	Code
SA-Q-15-SS-0.5	Bis (2-ethylhexyl)phthalate	U	390	Z
SA-Q-13-SS-1	Bis (2-ethylhexyl)phthalate	U	360	Z
AT-Q-21-SS-1	Bis (2-ethylhexyl)phthalate	U	<u>-</u>	Z
AT-Q-21-SS-1-D	Bis (2-ethylhexyl)phthalate	U	-	Z
AT-Q-19-SB-6	Bis (2-ethylhexyl)phthalate	U	460	Z
AT-Q-19-SB-6-D	Bis (2-ethylhexyl)phthalate	U	590	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			-
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			X
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			X
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			X
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.		3 99-40-99-99-99-99-99-99-99-99-99-99-99-99-99	X

Note:

7.0 Surrogate Recovery (Code S)

	<u> </u>				Yes	No	NA
7.1	Are all samp	les listed on the ap	ppropriate Surrogate Recovery	Summary Form ?	X		
7.2	Are surrogate	e surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?				x	
7.3	Are more tha	n one of either fra	ction outside the acceptance cri	teria?	x		
7.4	If Yes in Sect	tion 7.3, are these	sample(s) or method blank(s) re	eanalyzed?		X	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?						1
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.						
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R	 	T	

Note: Several samples had surrogate recoveries outside QC limits. Samples were not reanalyzed because they were out of holding time.

Field ID	Surrogate Recoveries	Surrogate	Surrogate Limits
SA-Q-15-SS-0.5	30 / 17 / 23	PHL / 2FP / TBP	38-102 / 36-101 / 27-124
SA-Q-14-SS-0.5	28 / 14 / 19	PHL / 2FP / TBP	38-102 / 36-101 / 27-124
SA-Q-14-SB-5	27 / 15	PHL / 2FP	38-102 / 36-101
AT-Q-21-SS-1-D	36 / 24 / 26	PHL / 2FP / TBP	38-102 / 36-101 / 27-124
AT-Q-19-SB-6	23 / 13 / 15 / 30 / 32 / 36	PHL / 2FP / TBP / NBZ / FBP / TPH	38-102 / 36-101 / 27-124 / 33-94 / 38-104 / 40-129
AT-Q-19-SB-6-D	34 / 22	PHL / 2FP	38-102 / 36-101

PHL = Phenol-d5 2FP = 2-Fluorophenol TBP = 2,4,6-Tribromophenol NBZ = Nitrobenzene-d5 FBP = 2-Fluorobiphenyl TPH = Terphenyl-d14

Field ID	Analyte	Qualification	Code
SA-Q-15-SS-0.5	all acid fraction	UJ ·	S
SA-Q-14-SS-0.5	all acid fraction	UJ	S
SA-Q-14-SB-5	all acid fraction	UJ	S
AT-Q-21-SS-1-D	all acid fraction	UJ	S
AT-Q-19-SB-6	all analytes	UJ/J	S
AT-Q-19-SB-6-D	all acid fraction	UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
t.	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Samples SA-Q-13-SS-1 and SA-Q-15-SB-2 were the MS/MSD client designated samples. 2,4-Dimethylphenol MS/MSD recoveries were 27 & 30% (40-112) in parent sample SA-Q-13-SS-1. Hexachlorocyclopentadiene MSD recovery was 11% (20-109) in parent sample SA-Q-15-SB-2 and the RPD was 72% when the maximum allowed is 50%. Sample SA-Q-10-SB-2 was used as a batch MS/MSD sample. Several spiking compounds and RPDs were recovered outside of control limits. Qualifications

were not made based on MS/MSDs alone and the LCS recoveries for these samples were within control limits.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

 		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		X	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.	X	-	

Note:

Note:

2,4,5-Trichlorophenol, 2,4-Dinitrophenol,4,6-Dinitro-2-methylphenol and pentachlorophenol LCS recoveries were outside of control limits in LCS 680-14752. No qualifiers were assigned because the sample related to this LCS was previously rejected due to holding times.

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal stan	dard area of every sample ar	nd blank within upper and lo	ower QC limits for each conti	nuing calibration?	x		
		Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				
Note:				I to the mid-point initial calib given sample, using informe				
		y choose not to flag individu			, J C ,			
10.2	Are retention times of internal standards within 30 seconds of the associated calibration standard?					X		
				positives or negatives exist. I a for non-detects in that samp				

Note:

11.0 TCL Identification

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?	2.480		X
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			. х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	×		
13.2	Were all RPD or absolute difference values within the control limits?		x	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample AT-Q-21-SS-1 was the parent sample to AT-Q-21-SS-1-D and sample AT-Q-19-SB-6 was the parent to AT-Q-19-SB-6 D.

Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.

Bis(2-ethylhexyl)phthalate determination had an RPD of 91% for samples SA-Q-10-SS-0.5 and SA-Q-10-SS-0.5-D.

14.0 Data Completeness

		Yes	No	NA
Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
Number of samples:	18	300 mm - 1		
Number of target compounds in each analysis:	65			
Number of results rejected and not reported:	0			·
% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
% Completeness	100			
	Number of samples: Number of target compounds in each analysis: Number of results rejected and not reported: % Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)	Number of samples: Number of target compounds in each analysis: Number of results rejected and not reported: Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample) Number of samples: Number of target compounds in each analysis: Number of results rejected and not reported: % Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample) Number of samples: Number of target compounds in each analysis: Number of results rejected and not reported: % Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)

DATA VALIDATION WORKSHEET PCBs ANALYSIS (Method 680)

Reviewer:

Amelia Turnell

Project Name:

Sauget - Area 2

Date:

10/12/2005

Project Number:

Review Level:

21561511.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS012 Level III

Major Anomolies:

No major anomalies found in this SDG.

Minor Anomolies:

Several sample were qualified due to surrogate and LCS recoveries.

Field IDs:

SA-Q-15-SS-0.5

SA-Q-13-SS-1

SA-Q-9-SS-0.5

SA-Q-10-SB-2

SA-Q-15-SB-2

SA-Q-13-SB-2

SA-Q-9-SB-5

SA-Q-10-SS-0.5-D

SA-Q-14-SS-0.5

SA-Q-11-SS-0.5

SA-Q-9-SB-5-D

SA-Q-14-SB-5

SA-Q-11-SB-2

SA-Q-10-SS-0.5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that surrogates, LCSs, MS/MSDs and internal standard recoveries were outside quality control limits.

Several samples were diluted.

2.0 Holding Time/ Preservation (Code H)

			Yes	No	NA
2	2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
		If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			,
2	2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
		Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2	2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		х	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

 		Yes	No	NA NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results (TCL)?		X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?	300.449		х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

Note:

6.0 Continuing Calibration (Code C)

,			Yes	No	NA
	6.1	Are Continuing Calibration Summary forms present and complete?	1.00		· x
	6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
	6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
		If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			· · · · · · · · · · · · · · · · · · ·
	6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			x

Note:

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7	7.1	Are all sampl	les listed on the ap	propriate Surrogate Recovery S	Summary Form ?	Х		
7	7.2	Are surrogate	recoveries within	n acceptance criteria specified in	the QAPP for all samples?		x	
7	7.3	If No in Secti	ion 7.2, were thes	e sample(s) or method blank(s)	reanalyzed?		x	
7	7.4	If No in Sectiout.)	ion 7.3, is any san	nple dilution factor greater than	apple dilution factor greater than 10? (Surrogate recoveries may be diluted			
			> UCL	10% to LCL	< 10%			
1		Positive	J	J	J			
		Non-detect	None	UJ	R			

Note:

Only one sample with the surrogate out of criteria was diluted by a factor greater than 10. The other samples with surrogates out of criteria were not diluted by a factor greater than 10. GPC clean-up was performed due to sample matrix and may have contributed to the surrogate loss.

Sample ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-11-SS-0.5	Decachlorobiphenyl-13C12	25	30-130
SA-Q-11-SB-2	Decachlorobiphenyl-13C12	18	30-130
SA-Q-9-SB-5	Decachlorobiphenyl-13C12	19	30-130
SA-Q-10-SB-2	Decachlorobiphenyl-13C12	20	30-130

Sample ID	Analytes	Qualification	Code
SA-Q-11-SS-0.5	All PCB analytes	J/UJ	S
SA-Q-11-SB-2	All PCB analytes	J/UJ	S
SA-Q-9-SB-5	All PCB analytes	UJ	S
SA-Q-10-SB-2	All PCB analytes	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

			Yes	No	NA
8.	3.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.	3.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	*		
8.	3.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
		Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Samples SA-Q-15-SB-2 and SA-Q-13-SS-1MS/MSD recoveries were outside QC limits; however, the LCS sample associated with these MS/MSD samples had recoveries within QC limits. No qualfication of data were required. Sample SA-Q-10-SB-2 MS/MSD recoveries were outside QC limits. The LCS associated with this MS/MSD sample had the majority of the LCS recoveries low. This sample has already been qualified J/UJ due to surrogates, and no additional qualifiers were assigned.

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

The LCS had recoveries outside the QC limits, qualifications are listed below.

LCS ID	Analytes	LCS Recoveries	Related Samples	
	All analytes with the exception of	All recoveries were below	SA-Q-11-SS-0.5, SA-Q-11-SB-2, SA-	
LCS 680-11675	DCB Decachlorobiphenyl and	the lower control limit. Q-9-SS-0.5, SA-Q-9-SB-5, SA-Q		
200 000 11075	Trichlorobiphenyl.	Neither of the recoveries	SB-5-D, SA-Q-10-SS-0.5, SA-Q-10-	
		were below 10%.	SS-0.5-D and SA-Q-10-SB-2	

Several related samples were already qualified due to low surrogate recoveries. Therefore, the additional qualifiers assigned are mentioned below.

Sample ID	Analytes	Qualification	Code
SA-Q-9-SS-0.5	All PCB	J/UJ	L
SA-Q-9-SB-5-D	All PCB	J/UJ	L
SA-Q-10-SS-0.5	All PCB	J/UJ	L
SA-Q-10-SS-0.5-D	All PCB	J/UJ	L

Nonachlorobiphenyl was not spiked in the LCS sample.

10.0 TCL Identification (Code w)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard			
10.1	RRT in the continuing calibration?			x

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			х
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for VOC analysis?	X		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check (90% for soil sample)	QAPP or use 95% for aqueous sample,	X		
13.2	Number of samples:	14			
13.3	Number of target compounds in each analysis;	10		 -	
13.4	Number of results rejected and not reported:	0			
H	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Bart Brandenburg

Date:

8/23/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60010

SAS012

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on holding time criteria and method blank contamination.

Field IDs:

SA-Q-10-FB

AA-P-4-82

AA-P-4-102

AA-Q-10-18

AA-Q-10-18-D

AA-P-4-112

AA-Q-10-38

AA-P-9-34

AA-Q-10-58

AA-Q-10-78

AA-P-9-54

AA-Q-10-94

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		-
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x	2.2	

Note:

The narrative indicated that the method blank had detections above the MDL.

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Tim	ne/ Preservation (Code H)	Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	х	0	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	1	x	

Note: The samples were re-extracted and analyzed outside holding time limits. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
SA-Q-10-FBRE	All Herbicides	9	J/UJ	Н
AA-P-4-82RE	All Herbicides	9	J/UJ	Н
AA-P-4-102RE	All Herbicides	9	J/UJ	Н
AA-Q-10-18RE	All Herbicides	9	J/UJ	Н
AA-Q-10-18-DRE	All Herbicides	9	J/UJ	Н
AA-P-4-112RE	All Herbicides	9	J/UJ	Н
AA-Q-10-38RE	All Herbicides	9	J/UJ	Н
AA-P-9-34RE	All Herbicides	9	J/UJ	Н
AA-Q-10-58RE	All Herbicides	9	J/UJ	Н
AA-Q-10-78RE	All Herbicides	9	J/UJ	Н
AA-P-9-54RE	All Herbicides	9	J/UJ	Н
AA-Q-10-94RE	All Herbicides	9	J/UJ	Н

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?	х		
3.3	Do any field/rinse/equipment blanks have positive results?	х		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.	<u> </u>		

Note: The method and field blanks had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
AA-P-4-82	2,4-D		U	Х
AA-Q-10-18	2,4-D	-	U	X
AA-Q-10-18	Pentachlorophenol	1.4	U	Х
AA-P-4-112	Pentachlorophenol	-	U	Х
AA-Q-10-38	2,4-D	-	U	Х
AA-Q-10-58	2,4-D	-	Ŭ	X
AA-Q-10-58	Pentachlorophenol	0.27	Ŭ	Х
AA-Q-10-78	2,4-D	-	U	X
AA-Q-10-78	Pentachlorophenol	-	U	Х
AA-Q-10-94	2,4-D		U	Х
AA-Q-10-94RE	Pentachlorophenol	0.38	U	X

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			X

5.0 Continuing Calibration (Code C)

 		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			Х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $< 20\%$)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samp	les listed on the ap	propriate Surrogate Recovery S	Summary Form ?	х		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?						
6.3	If No in Sect	ion 6.2, were these	e sample(s) or method blank(s)	reanalyzed?		•	x
6.4	If No in Sect	ion 6.3, is any sam			x		
		> UCL	10% to LCL	< 10%		-	
	Positive	J	J	J			
<u> </u>	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			х
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X	-	
8.4	If Level IV, verify the % recoveries are calculated correctly.	***************************************		x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			X
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations	· · · · · · · · · · · · · · · · · · ·		
3.7			<u> </u>	

Note: Sample AA-Q-10-18 was the parent sample for AA-Q-10-18-D

11.0 Field Duplicate Samples (Code F)

· · · · · · · · · · · · · · · · · · ·		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	X		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		***	

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP sample)	or use 95% for aqueous sample, 90% for soil	x		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0		***	
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Amelia Turnell	Project Name:	Sauget - Area 2	
Date:	10/13/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 012	
		Review Level:	Level III	
Major Anomalies:				
	Three mercury samples were rejected due to hold times.			
Minor Anomalies:				
	Samples required qualification based on holding times, blanks, laboratory duplie	cates, MS/MSD spikes, serial dilutions and fi	eld duplicate RPDs.	
Field IDs:	SA-Q-15-SS-0.5	AT-Q-19-SB-6-D	SA-Q-11-SS-0.5	
	SA-Q-15-SB-2	SA-Q-13-SS-1	SA-Q-11-SB-2	
	SA-Q-10-SB-2	SA-Q-13-SB-2	SA-Q-9-SS-0.5	
	SA-Q-10-SS-0.5-D	AT-Q-21-SS-1	SA-Q-9-SB-5	
	SA-Q-14-SS-0.5	AT-Q-21-SS-1-D	SA-Q-9-SB-5-D	
	SA-Q-14-SB-5	AT-Q-19-SB-6	SA-Q-10-SS-0.5	

1.0 Chain of Custody/Sample Condition/Raw Data

			ICP		ICP		ICI		ICP-MS		GFAA		CVAA-Hg		Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA		
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									X				
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									X				
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?			-	394,009,000						х				
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	X							138852		X				
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	x									x				

Note:

The laboratory case narrative indicated that one serial dilution and the MS/MSDs had recoveries outside the QC limits. Several samples were diluted due to abundance of target analytes. The narrative also indicated that several mercury samples were analyzed outside holding times.

2.0 Holding Time (Code H)

			ICP		ICP		ICP		ICP		ICP		ICP-MS		1S	GFAA		4	CVAA-Hg		Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA								
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.	l	Х					:			х										
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.																				

Note: Several mercury samples were analyzed outside holding times. Qualifications are listed below.

Field ID	Analyte	Days past hold time	Qualification	Code
SA-Q-13-SB-2	Mercury	15	Ј	Н
AT-Q-19-SB-6	Mercury	15	J	Н
AT-Q-19-SB-6-D	Mercury	15	J	Н
SA-Q-9-SS-0.5	Mercury	37	R	Н
SAQ-9-SB-5	Mercury	37	R	Н
SAQ-9-SB-5-D	Mercury	37	R	Н

3.0 Instrument Calibration (Code C)

							ICP		I	CP-M	1S	(GFA.	4	C/	/AA-	Hg
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand				lank + one standard	;		x									
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: J	(+)/UJ(-).							Samue 1 - S			rdens vi 1777 estato		x
3.3	Was an initial calibration Action: If no, use profess narrative.							х						-			x
3.4	Was continuing calibration whichever is more frequer the data and note in review	nt? Action:						х									x
3.5	Are all calibration standa Mercury (80%-120%) and			and CCV) within	the control limits'	?		х									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)												
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%					<u> </u>							

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		I	CP-N	1S	(GFA/	4	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	х									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										Х	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	X									X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										х	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.	х									-	X	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		х									x	

Note: Several target analyte values were detected above the IDL, the qualifications are listed below.

Sample ID	Analytes	Qualification	Code	NEW RL
SA-Q-9-SS-0.5	Sodium	U	P	150
SA-Q-9-SB-5	Sodium	U	P	110
SA-Q-9-SB-5-D	Sodium	U	P	140
SA-Q-10-SS-0.5-D	Sodium	U	P	220

5.0 ICP Interference Check Sample (ICS) (Code N)

				ICP		I	CP-N	AS		GFA.	A	C.	/AA-	Hg
 		Y	es	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), ar beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	nd at the			х									
5.2	Are the ICS AB recoveries within 80% - 120%?				х					1				
5.3	Are the results for unspiked analytes (in ICS A) < + IDL?				х					1		<u> </u>		
5.4	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level ICS?	el in the			x									
	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)									 				
	<-IDL > IDL <50% 50% - 79% > 120%													
	$UJ(-) \qquad J(+) \qquad R(+/-) \qquad J(+)/UJ(-) \qquad J(+)$					24								

Note:

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

								ICP		ICP-MS		1S	(GFA.	1	CV	AA-	Hg
				. <u>.</u>			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1	Was an LCS matrix and p	prepared and er level)? Ac	analyzed at to	he correct freque +) any sample n	ency (one per 20 ot associated wit	samples, per batch, per h LCS results.	X									X		
6.2	Is any LCS r Sb; Solid lim				ous limits: 80% -	120% - except Ag and	, , , ,	x	·								X	
•	Action:	So	lid		Aqueous													
		< LCL	> UCL	< 50%	50% - 79%	> 120%							ļ					
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

7.0 Laboratory Duplicates (Code K)

				ICP		I	CP-M	IS		GFA/	1	CV	AA-	Hg
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.										x		
	7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.	\$555as	X					Sever				Х	
	7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids) Action: If no, J(+).		х							-	X		
Ľ		Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.				-44						San S		

Note:

Samples SA-Q-15-SB-2 and SA-Q-13-SS-1 were analyzed in duplicate. Several analytes had RPD values outside QC limits, qualifications are listed below.

Sample ID	Analytes	Qualification	Code
SA-Q-15-SB-2	Iron	J	K
SA-Q-15-SB-2	Nickel	J	K
SA-Q-13-SS-1	Calcium	J	K

8.0 Spike Sample Analysis - Pre-Digestion (Code M - Recovery, Code D - RPD)

						ICP		IC	CP-M	IS		GFA.	1	CV	/AA-	Hg
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	N/
8.1	Was a spiked sabatch, per matri associated with	x and per lev	el)? Action: If no, J(+), w	rect frequency (one per 20 samples, p vith professional judgment, analytes n	er Ot x									X		
8.2	Was a field blan Note in worksho		e MS analysis? Action:	If yes, J(+) with professional judgmer	t.	X							·		x	
	Note: Matrix s sample in an SE		may be performed on a fi	ield blank when it is the only aqueou	ıs											
8.3	For all analytes the control limi spike concentrate	t of 75-125%	concentration < 4 x spike control limit applie	oncentration, are spike recoveries with es to analytes with concentration > 4	n X	x									x	
	%R	> 125%	30% < %R < 74%	%R < 30%												
	Positive	J	J	J												_
	Non-detect	None	UJ	R								_				_

Note:

Samples SA-Q-15-SB-2 and SA-Q-13-SS-1 were spiked and analyzed for metals and mercury. Qualifications are listed below.

Field ID	Analyte	Recoveries	Limits
SA-Q-15-SB-2	Antimony	38/36/3	75-125 / 20
SA-Q-15-SB-2	Cadmium	22 / 110 / 23	75-125 / 20
SA-Q-15-SB-2	Nickel	53 / 337 /76	75-125 / 20
SA-Q-15-SB-2	Silver	140 / 113 / 15	75-125 / 20
SA-Q-13-SS-1	Antimony	42 / 44 / 5	75-125 / 20
SA-Q-13-SS-1	Potassium	108 / 131 / 7	75-125 / 20
SA-Q-15-SB-2	Mercury	148 / 291 / 11	80-120 / 20

Field ID	Analyte	Qualification	Code
SA-Q-15-SB-2	Antimony	J	M
SA-Q-15-SB-2	Cadmium	J	M
SA-Q-15-SB-2	Nickel	Already qualified due to K	M
SA-Q-15-SB-2	Silver	J	M
SA-Q-13-SS-1	Antimony	J	M
SA-Q-13-SS-1	Potassium	J	M
SA-Q-15-SB-2	Mercury	J	M

9.0 Instrument Detection Limits (IDL)

			ICP)	I	CP-M	IS		GFA.	A	CV	AA-	Hg
F		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1 A	Are all IDL equal to or less than the reporting limits specified?			х	1								x

Note:

10.0 ICP Serial Dilutions (Code S)

10.1 Were serial dilutions performed? Was a five-fold dilution performed? 10.2 Was a five-fold dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).					ICP		I	CP-M	1S		GFA.	A	CV	AA-	Hg
10.2 Was a five-fold dilution performed? 2	_	·=·		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the	L_	10.1	Were serial dilutions performed?	x									х		
		10.2	Was a five-fold dilution performed?	x									x		
		10.3			х								х		

Note: Samples SA-Q-15-SB-2, SA-Q-11-SS-0.5 and SA-Q-13-SS-1 were diluted and analyzed. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SA-Q-15-SB-2	Lead	Ј	S
SA-Q-15-SB-2	Magnesium	J	S
SA-Q-15-SB-2	Zinc	J	S

11.0 Field Duplicate Samples (Code F)

				ICP		I	CP-M	1S	GFAA			CVAA-H		Hg
_			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
L	11.1	Were any field duplicates submitted for metal analysis?	x									x		
	11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or		х								X		
L		difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$)						1				Α.		

Note:

Sample AT-Q-21-SS-1 was the parent sample to AT-Q-21-SS-1-D and sample AT-Q-19-SB-6 was the parent to AT-Q-19-SB-6 D.

Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.

Duplicate samples were outside QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
AT-Q-21-SS-1	Aluminum	J	F
AT-Q-21-SS-1-D	Aluminum	J	F
AT-Q-21-SS-1	Barium	J	F
AT-Q-21-SS-1-D	Barium	Ј	F
AT-Q-21-SS-1	Cadmium	J	F
AT-Q-21-SS-1-D	Cadmium	J	F
AT-Q-21-SS-1	Lead	J	F
AT-Q-21-SS-1-D	Lead	J	F
AT-Q-21-SS-1	Magnesium	J	F

Field ID	Analyte	Qualification	Code
AT-Q-21-SS-1	Manganese	J	F
AT-Q-21-SS-1-D	Manganese	J	F
AT-Q-21-SS-1	Zinc	J	F
AT-Q-21-SS-1-D	Zinc	J	F
SA-Q-10-SS-0.5	Barium	J	F
SA-Q-10-SS-0.5-D	Barium	J	F
SA-Q-10-SS-0.5	Chromium	J	F
SA-Q-10-SS-0.5-D	Chromium	J	F
SA-Q-10-SS-0.5	Copper	J	F
SA-Q-10-SS-0.5-D	Copper	J	F
SA-Q-10-SS-0.5	Iron	J	F
SA-Q-10-SS-0.5-D	Iron	J	F
SA-Q-10-SS-0.5	Lead	J	F
SA-Q-10-SS-0.5-D	Lead	J	F
SA-Q-10-SS-0.5	Zinc	J	F
SA-Q-10-SS-0.5-D	Zinc	J	F

12.0 Result Verification (Code Q)

			ICP		I	CP-M	-MS GFAA			Ą	CVAA-Hg		Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			x									х
12.2	Were all dilution reflected in the positive results and detection limits?			х									x

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
13.2	Number of samples:	18	 0	0	 18
13.3	Number of target compounds in each analysis:	22	22	0	1
13.4	Number of results rejected and not reported:	0	0	0	3
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100	#####	####	83.3

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:Amelia TurnellDate:10/13/2005LaboratorySevern Trent Laboratory - SavannahTest Name:Ammonia

350.1

 Project Name:
 Sauget - Area 2

 Project Number:
 21561510.60011

 SDG No.:
 SAS 012

Level III

Review Level:

Major Anomalies:

Method No.:

No analytes were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

SA-Q-15-SS-0.5	SA-Q-13-SB-2	SA-Q-11-SS-0.5
SA-Q-15-SB-2	AT-Q-21-SS-1	SA-Q-11-SB-2
SA-Q-14-SS-0.5	AT-Q-21-SS-1-D	SA-Q-9-SS-0.5
SA-Q-14-SB-5	AT-Q-19-SB-6	SA-Q-9-SB-5
SA-Q-13-SS-1	AT-Q-19-SB-6-D	SA-Q-9-SB-5-D
SA-Q-10-SB-2	SA-Q-10-SS-0.5-D	SA-Q-10-SS-0.5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		¥	

2.0 Holding T	Cime/ Preservation (Code H)	Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated ($> 10^{\circ}$ C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		Х	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

<u> </u>		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?	V.1		x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
·	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For $R < 50\%$, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
·	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples SA-Q-13-SS-1 and SA-Q-15-SB-2 were spiked and analyzed as the MS/MSD.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

8.0 Analyte Identification

		Yes	No	NA
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			х

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
9.4	If Level IV, calculate a sample of positive results to verify correct calculations		20	

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted for ammonia analysis?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			-

Note:

Sample AT-Q-21-SS-1 was the parent sample to AT-Q-21-SS-1-D and sample AT-Q-19-SB-6 was the parent to AT-Q-19-SB-6 D.

Sample SA-Q-9-SB-5 was the parent sample to SA-Q-9-SB-5-D and sample SA-Q-10-SS-0.5 was the parent to SA-Q-10-SS-0.5-D.

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, $J(+)$, with professional judgment, analytes not associated with duplicate results.		х	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.		and the second	X
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)			
12.2	Number of samples: 18			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)			
	% Completeness 100			

VOLATILE ORGANIC ANALYSIS DATA VALIDATION WORKSHEET

		Review Level:	Level III
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	E10 SVS
Date:	\$007/61/8	Project Number:	11009.01213212
Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2

Major Anomalies:

No samples were rejected

Minor Anomalies:

Field IDs:

No analytes required qualification, based on this data review.

4£-9-4-AA	AA-Q-10-38
AA-Q-18-D	81-01-Q-AA
28-4-q - AA	84-01-Q-AS

AA-Q-10-78 TB-12

1.0 Chain of Custody/Sample Condition

	X		Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	
		X	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	2.1
		X	Do Chain-of-Custody forms list all samples analyzed?	1.1
W/AT	ONT	C2 T		

48-9-9-4A

44-01-9-AA

82-01-Q-AA

AA-P-4-102 AA-P-4-112 Note: No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

2.3	Have any technical h	olding times been gro	saly (twice the holdin	time) exceeded? If yes,	J(+)/R(-).		X	
· 	Soil/Sediment	7° 2±3° 4	14 days	14 days				
		Yes	syab 41	14 days				
	Aqueous	οN	syab 7	l4 days				
	xirtsM	Preserved	Aromatic	All others				
2.2	Have any technical h	olding times, determin	ot gnilqmss mort bər	ate of analysis, been exc	eeded? If yes, J(+)/UJ(-).		X	
	temperature is outsid		s gaft °01 ot (nesorit	" positive results with a	nt in report. If unpreserved or "U". If and all non-detects "U". If			
1.2	Do sample preservat	ion, collection and sto	n təəm noitibnoə əga:	thod requirement?		X		
	- : : :: : : : : : : : : : : : : : : :		· · · · · ·			səд	oN	VN

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3.0 GC/MS Instrument Performance Check (Code T)

Х			Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.	5.5
x			Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	3.2
x			Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?	1.5
WNI	ONI	X GS		

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blank Contamination, Code X - Field Blank Contamination, Code X - Field Blank Contamination, Code X - Method blank contamination)

X			If Level IV, review raw data and verify all detections for blanks were reported.	t. t
			"I" flagged) concentrations.	
			Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory	
		Х	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	4.3
	X		Do any method blanks have positive VOA results (TCL and/or TIC)?	2.₽
		X	Is a Method Blank Summary form present for each batch?	I.p
٧N	oN	sәд		

Note: The field blank sample had a detection of toluene; however all associated samples were reported as non-detect. No qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

				.04014
			If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	ζ.ζ
X			Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	4.8
x			Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.	€.₹
			If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	
X			Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?	2.2
X			Are Initial Calibration summary forms present and complete for each instrument used?	1.2
٧N	ON	SƏ Z		

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6.0 Continuing Calibration (Code C)

			If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.	9.9
X			Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.	č .9
			If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.	
х			Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?	4.8
x			Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	€.9
X			Has a continuing calibration standard been analyzed every 12 hours?	2.9
x			Are Continuing Calibration Summary forms present and complete?	1.9
WAI.	ONT	r c2		

Note:

7.0 Surrogate Recovery (Code S)

	Non-detect	None	ເບ	В			
	Positive	ſ	ſ	ſ		•	
		> NCF	10% to LCL	%0I >			
	reanalysis is r						
				ples chosen for the MS/MSD or diluted			
4.7	If No in Secti	rmes yns si ,E.7 noi:	le dilution factor greater than	0? (Surrogate recoveries may be diluted			X
£.7	If No in Secti	ion 7.2, were these	subje(s) or method blank(s)	Sanalyzed?			х
2.7	Are surrogate	e recoveries within	ni berticequa specified in	the QAPP for all samples?	Х		
1.7	Are all sampl	les listed on the app	ropriate Surrogate Recovery S	mmary Form ?	X		
					x es	ON	٧N

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8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

				.04014
		T .	require rejection. RPD failures may be flagged "J" (+ only)	
			criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries < 10% may	
			Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC	
x			Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	€.8
x			Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	2.8
	x		Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	1.8
٧N	0N	SЭД		

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9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

٧N	ON SƏX	OX	
	X	Is an LCS recovery form present?	1.6
	X	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	2.6
	X	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	€.6
х		If Level IV, verify the % recoveries are calculated correctly.	7 .6
		Action for specific compound outside the acceptance criteria: %R>UCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)	

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(Code I) Internal Standards (Code I)

AN	ONI	SƏ X	Ower OC limits?	and blank within upper and	dard areas for every sample	Are internal stan	1.01	
		X	Area < - 10%	Λrea < -50%	Area > +100%			
			ſ	ſ	f	Positive		
			В	tU .	SnoV	Non-detect		
		1,	d to the mid-point initial calibration, not sample to given sample, using informed professional judgmer	specifications are met for a		continuing calib	Note:	
		X	Are retention times of internal standards within 30 seconds of the associated calibration standard?					
			Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.					

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х			Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	7.11
х			Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	1.11
AN	ON	Хes	THICKION (CODE W)	II.U ICLIden

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				. 14
X			If Level IV, calculate a sample of positive results to verify correct calculations	12.5
X			Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	12.4
x			9 Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	12.3
X			Are these limits adjusted to reflect dilutions and/ or percent solids as required?	17.2
X			Are RLs used consistent with those specified in the QAPP?	1.21
٧N	o _N	хәд	Quantitation and Reported Detection limits (Code K)	2.0 TCL/TIC

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			20,0,0,1,0,1	. 14
			Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.	
		X	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	13.2
		X	Were any field duplicates submitted for VOC analysis?	13.1
W/NI	ONT	162	neare Samples (Court)	dna nora oct

Note: Sample AA-Q-10-18 was the parent sample for AA-Q-10-18-D

14.0 Data Completeness

	% Completeness	100			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
14,4	Number of results rejected and not reported:	0			-
14.3	Number of target compounds in each analysis:	33			
14.2	Number of samples:	13			
1.4.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for a sample)	5% for aqueous sample, 90% for soil	X		
		-	SƏ A	ONI	VN

SEMIAOLATILE ORGANIC ANALYSIS DATA VALIDATION WORKSHEET

	Samples were rejected based on holding time criteria		
IsmonA vojsM	lies:		
		Review Level:	Level III
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	£10 SAS
Date:	\$107/5002	Project Number:	11009.01519512
Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
		•	

Samples were qualified based on surrogate recoveries.

2A-Q-10-FA AA-Q-10-18-D AA-P-4-10. AA-Q-10-19-AA A-Q-10-7-A AA-Q-10-7-A 1.0 Chain of Custody/Sample Condition

		х	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	£.1
		X	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	2.1
		X	Do Chain-of-Custody forms list all samples analyzed?	1.1
WAT	ONT	I G2		·

Samples were reanalyzed outside of holding time.

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Field IDs:

Minor Anomalies:

The surrogates and internal standards had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

	X	Do sample preservation, collection and storage condition meet method requirement?	1.2
 		If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 OC), then flag all positive results with a "J" and all non-detects "UJ".	
	x	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	7.7
<u>.</u>		Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days	
	X	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	2.3

Note: One sample was reanalyzed outside holding time criteria. Qualifications are listed below.

Н	SS	В	VII ZAOC2	AA-Q-10-38RE
Code	Days late	Qualification	Analyte	Tield ID

3.0 GC/MS Instrument Performance Check (Code T)

			If no, all standards, blanks, field samples and QC samples are rejected "R".	
x			Have ion abundance criteria for DFTPP been met for each instrument used?	ε.ε
			If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".	, , , , , , , , , , , , , , , , , , , ,
х			Have all samples been analyzed within twelve hours of the tune?	3.2
x			Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	1.5
ΨN	ONI	Хes		

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4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		-		
<i>p.p.</i>	If Level IV, review raw data and verify all detections for blanks were reported.			Х
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
٤.4	Do any field equipment blanks have positive results (TCL, and/or TIC)?		X	
7.4	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
1.4	Is a Method Blank Summary form present for each batch?	X	_	
		Хes	ONI	٧N

Note:

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5.0 GC/MS Initial Calibration (Code C)

X			If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	ζ.ζ
x			Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	4.2
x			Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).	€.2
			If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	
x			Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?	2.2
х			Are Initial Calibration summary forms present and complete for each instrument used?	I.č
٧N	ON	səд		

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(Code Continuing Calibration (Code C)

VN	ONI	sə x		
X			Are Continuing Calibration Summary forms present and complete?	1.8
X			Has a continuing calibration standard been analyzed every 12 hours?	2.9
X			Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.	£.8
x			Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $<$ 20%)?	4.8
			If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.	
X			Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.	
	<u> </u>		If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.	9.9

7.0 Surrogate Recovery (Code S)

		<u> </u>						
	Non-detect	None	tU	В			•	
	Positive	ſ	ſ	1				
		> NCF	10% to PCL	< 10%				
		C recoveries display trals are assessed sep		e MS and/ or diluted samples,	hen no reanalysis is required and a	s		
S.T	If Yes in Section 7.3, is any sample dilution factor greater than 10?						:	X
4 .7	If Yes in Sect	ion 7.3, are these sa	nple(s) or method blank(sanalyzed?			х	
€.7	Are more than	n one of either fracti	on outside the acceptance	teria?		X		
Z. <i>T</i>	Are surrogate	recoveries within a	eriteria specific	the QAPP for all samples and	wetpoq pjsuks?		x	
1.7	Are all sampl	les listed on the appı	opriate Surrogate Recove	Summary Form ?		X		
		: =	.=			sәд	ON	٧N

Note: Surrogate recoveries were outside QC limits for one sample. Qualifications are listed below.

[outque.	monding at a contract of the c	PDD-7 Fluoredriabonul MDZ-Mitropores	ЗЕБ-3-Епосовр
26-100, 59-103, 60-102, 55-104, 55-126	50, 47, 47, 12, 49	2FP, FBP, VBZ, PHL, TBP	86-01-Q-AA
simid strgorate	Surrogate recoveries	Surrogate	Field ID

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP2,4,6-Tribromophenol

S	tU\t	Ali SVOCs	8E-01-Q-AA
Code	noiteofliku	sojylenA	Hield ID

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

x			Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory? Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria	£.8
x			Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	2.8
	х		Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	1.8
ΨN	ON	SƏ X		

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Note:
	If Level IV, verify the % recoveries are calculated correctly.	1 .9
RPD	Action for specific compound outside the acceptance criteria: %R>UCL, 1(+) only; <lcl, "j"="" (+="" 1(+)="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" should="" td="" uj(-);=""><td></td></lcl,>	
X	Are all LCS %Rs (and RPDs) within acceptance criteria?	£.6
X	Is LCS analyzed at the required frequency for each matrix?	2.6
X	Is an LCS recovery form present?	1.9
VN ON SƏX		

10.0 Internal Standards (Code I)

Note:

	the reviewer may	consider partial or total rej	or to determine in any raise parties of the data for non-de	ostaves or negatives exist ects in that sample/fractio	For shift of a large magnitude.			
2.01		es of internal standards with			shutimoom comel class thide nod	X		
lote:	continuing calibr	ification is for the continuing ation. Thus, if all other QC 200e not to flag individual s	specifications are met for a		oration, not sample to ned professional judgment, the			
	Non-detect	None	ιU	Я				
	Positive	ſ	ſ	ľ				
		Area > +100%	Area < -50%	Area < -10%				
1.01	Are internal stand	dard area of every sample a	d blank within upper and lo	wer QC limits for each co	finuing calibration?		X	
	<u>;=</u>					SЭД	ONI	ΨN

The field blank had internal standards outside QC limits. No qualification of data was required.

II.0 TCL Identification (Code W)

x			Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?	2.11
х			Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	1.11
¥N	0N	sәд		

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12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

X			If Level IV, calculate a sample of positive results to verify correct calculations	12.5
x			Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	12.4
X			Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	12.3
X			Are these limits adjusted to reflect dilutions and/ or percent solids as required?	12.2
x			Are RLs used consistent with those specified in the QAPP?	12.1
N/NT	ONT	Saı		

Note:

13.0 Field Duplicate Samples (Code F)

			Sample AA-Q-10-18 was the parent sample to AA-Q-10-18-D	Note:
			Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.	
		X	Were all RPD or absolute difference values within the control limits?	13.2
		X	Were any field duplicates submitted for SVOC analysis?	1.51
WAT	ONT	Sar		

14.0 Data Completeness

	% Completeness	100			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
14.4	Number of results rejected and not reported:	0			
14.3	Number of target compounds in each analysis:	\$9			
14.2	Number of samples:	12			
141	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sa	equeous sample, 90% for soil sample)	X		
			səд	oN	٧N

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DYLY AVIDYLION MOBERHELL

Level III	Review Level:		
E10 SVS	SDG No.:	Severn Trent Laboratory - Savannah	Гарога tогу
11561511.60011	Project Number:	\$007/61/8	Date:
Sauget - Area 2	Project Name:	Bart Brandenburg	Reviewer:

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

SA-Q-10-FB

Field IDs: SA-C

1.0 Chain of Custody/Sample Condition

		x	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	£.1
		x	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	2.1
		x	Do Chain-of-Custody forms list all samples analyzed?	1.1
٧N	oN	səд		

Note: The laboratory case narrative indicated that the LCS recovery was outside QC limits

2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10° C), then flag all positive results with a "J" and all non-detects "UJ".			
1.2	Do sample preservation, collection and storage condition meet method requirement?	X		
I gaibloh	ime/ Preservation (Code H)	səд	oN	ΨN

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3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

x			If Level IV, review raw data and verify all detections for blanks were reported.	4.8
			Action: Positive sample results <5X the blank concentrations he qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.	
	X		Do any field/rinse/equipment blanks have positive results (TCL)?	5.5
	X		Do any method blanks have positive results (TCL)?	3.2
		X	Is a Method Blank Summary form present for each batch?	1.5
٧N	ON	səд	•	

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

If no, all standards, blanks, field samples and QC samples are rejected "R".		
Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?		x
If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".		
Have all samples been analyzed within twelve hours of the performance check sample?		х
Are Endrin and 4,4'-DDT breakdown forms present?		x
	Have all samples been analyzed within twelve hours of the performance check sample? If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R". Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?	Have all samples been analyzed within twelve hours of the performance check sample? If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R". Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?

Note:

5.0 Initial Calibration (Code R)

X			If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	5.3
			If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	
x			Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument	2.2
X			Are Initial Calibration summary forms present and complete for each instrument used?	1.2
ΨN	ONI	SƏ X		

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(O obo Continuing Calibration (Code C)

4.8	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.		X
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.		
£.8	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?		x
2.9	Has a continuing calibration standard been analyzed every 12 hours?		x
1.8	Are Continuing Calibration Summary forms present and complete?		х
	X G NO	ON	ΨN

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7.0 Surrogate Recovery (Code S)

				Я	t U	None	Non-detect	
				ſ	ſ	ſ	Positive	
			· · · · · · · · · · · · · · · · · · ·	%0I >	10% to LCL	> NCF		
x			eries may be diluted out.)	0? (Surrogate recov	ole dilution factor greater than	lmse yns si ,E.7 no	If No in Secti	1 .7
x				eanalyzed?	sample(s) or method blank(s) r	on 7.2, were these	If No in Secti	E.T
<u>.</u>		X	ubjess	the QAPP for all san	acceptance criteria specified in	recoveries within	Are surrogate	Z.T
		X		rmmary Form ?	propriate Surrogate Recovery Sa	es listed on the app	Are all sampl	I.T
ΨN	ON	SƏX						

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

			Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries $<10\%$ may require rejection. RPD failures may be flagged "J" $(+ \text{ only})$	
x			Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	€.8
x			Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	2.8
	Х		Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	1.8
WN	ONI	x es		

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

	Action for specific compound outside the acceptance criteria: %R>UCL, 1(+) only; <lcl, "j"="" (+="" 1(+)="" <10%="" be="" failures="" flagged="" only)<="" r(-).="" rpd="" should="" th="" u1(-);=""><th></th><th></th></lcl,>		
7 .6	If Level IV, verify the % recoveries are calculated correctly.		x
£.9	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X	
2.6	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?		
1.9	Is an LCS recovery form present?		
	ON SA	ONT S	₩N

Note: The LCS had recoveries outside the QC limits; however, the LCS is associated with the field blank. No qualification of data was required.

VN.	on	sәд	iffication (Code W) Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing	
x			calibration?	1.01

Note:

x			Are these limits adjusted to reflect dilutions and/ or percent solids as required? Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	2.11	
х			Are RLs used consistent with those specified in the QAPP?	1.11	
VN	oN	sәд	1.0 TCL Quantitation and Reported Detection limits (Code P)		

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			Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.	
X			Were all RPD or absolute difference values within the control limits outlined in the QAPP?	12.2
	х		Were any field duplicates submitted for analysis?	1.21
ΨN	ON	S9 X	2.0 Fried Dupneare Samples (Code F)	

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13.0 Data Completeness

			100	% Completeness	
				% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$	
			0	Number of results rejected and not reported:	4.81
			12	Number of target compounds in each analysis:	£.£I
			I	Number of samples:	13.2
	***	X	5% for aqueous sample, 90% for soil	Is % completeness within the control limits? (Control limit: Check QAPP or use 95	1.81
٧N	oN	səд			

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DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Bart Brandenburg

Date:

8/23/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60010

SAS012

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on holding time criteria and method blank contamination.

Field IDs:

SA-Q-10-FB

AA-P-4-82

AA-P-4-102

AA-Q-10-18

AA-Q-10-18-D

AA-P-4-112

AA-Q-10-38

AA-P-9-34

AA-Q-10-58

AA-Q-10-78

AA-P-9-54

AA-Q-10-94

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The narrative indicated that the method blank had detections above the MDL.

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Hold	ling Tim	e/ Preservation (Code H)	Yes	No	NA
	2.1	Do sample preservation, collection and storage condition meet method requirement?	Х		
		If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
		elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
	2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	x		
		Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
	2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note: The samples were re-extracted and analyzed outside holding time limits. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
SA-Q-10-FBRE	All Herbicides	9	J/UJ	Н
AA-P-4-82RE	All Herbicides	9	J/UJ	Н
AA-P-4-102RE	All Herbicides	9	J/UJ	Н
AA-Q-10-18RE	All Herbicides	9	J/UJ	Н
AA-Q-10-18-DRE	All Herbicides	9	J/UJ	Н
AA-P-4-112RE	All Herbicides	9	J/UJ	Н
AA-Q-10-38RE	All Herbicides	9	J/UJ	Н
AA-P-9-34RE	All Herbicides	9	J/UJ	Н
AA-Q-10-58RE	All Herbicides	9	J/UJ	Н
AA-Q-10-78RE	All Herbicides	9	J/UJ	H
AA-P-9-54RE	All Herbicides	9	J/UJ	Н
AA-Q-10-94RE	All Herbicides	9	J/UJ	Н

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?	x		
3.3	Do any field/rinse/equipment blanks have positive results?	х		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method and field blanks had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
AA-P-4-82	2,4-D	-	U	X
AA-Q-10-18	2,4-D	-	U	Х
AA-Q-10-18	Pentachlorophenol	1.4	U	Х
AA-P-4-112	Pentachlorophenol	-	U	X
AA-Q-10-38	2,4-D	-	U	X
AA-Q-10-58	2,4-D	-	U	Х
AA-Q-10-58	Pentachlorophenol	0.27	U	Х
AA-Q-10-78	2,4-D	-	U	X
AA-Q-10-78	Pentachlorophenol	-	U	X
AA-Q-10-94	2,4-D	-	U	X
AA-Q-10-94RE	Pentachlorophenol	0.38	U	X

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			x

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?		2. No. 2.	x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

						Yes	No	NA
6.1	Are all sampl	les listed on the a	ppropriate Surrogate Recovery S	Summary Form ?		x		
6.2	Are surrogate	e recoveries with	in acceptance criteria specified in	the QAPP for all samples?		X		
6.3	If No in Secti	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?					х	
6.4	If No in Secti	ion 6.3, is any sa	mple dilution factor greater than	10? (Surrogate recoveries may be d	iluted out.)			х
		> UCL	10% to LCL	< 10%				
	Positive	J	. J	J			·	
	Non-detect	None	UJ	R				

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			х
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			х
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td>-</td><td></td></lcl,>		-	

Note:

9.0 TCL Identification (Code W)

-			Yes	No	NA
	9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
9.1		continuing calibration?			X

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
10.4	If Level IV, calculate a sample of positive results to verify correct calculations	· · · · · · · · · · · · · · · · · · ·		

Note: Sample AA-Q-10-18 was the parent sample for AA-Q-10-18-D

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	X	-	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2 21561510.60011 SAS013	
Date:	8/23/2005	Project Number:		
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:		
		Review Level:	Level III	
Major Anom	nalies:		<u></u>	•
	No samples were rejected			
Minor Anom	nalies:		-	
	Samples were qualified based on MS/MSD recoveries.			
Field IDs:	SA-Q-10-FB	AA-P-4-82	AA-P-4-102	
	AA-Q-10-18	AA-Q-10-18-D	AA-P-4-112	
	AA-Q-10-38	AA-P-9-34	AA-Q-10-58	
	AA-Q-10-78	AA-P-9-54	AA-Q-10-94	

1.0 Chain of Custody/Sample Condition/Raw Data

			ICP		I	CP-M	S	(3FAA	À	C	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	х									X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?											X	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: 4 0 C $\pm ^{2}$ 0 C)	X									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes. % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	X								01. 2. 10.100000	X		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

Although it is beyond the scope of this review, it should be noted that the CCV had recoveries outside QC limits.

2.0 Holding Time (Code H)

			ICP			CP-M	S	(GFA/	4	C	VAA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been	1	, and a second				П					х	
2.1	exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		X										
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.												

Note:

3.0 Instrument Calibration (Code C)

							ICP		ICP	-MS		GFA.	A	CV	/AA-	Hg
						Yes	No N	ΑYe	s N	ío N	A Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand			,	ank + one standard;		2					3				
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: Jo	(+)/UJ(-).							31				х
3.3	Was an initial calibration Action: If no, use profess narrative.						3									х
3.4	Was continuing calibration whichever is more frequer the data and note in review	nt? Action:	If no, use professi				. 2									х
3.5	Are all calibration standa Mercury (80%-120%) and			nd CCV) within	the control limits?		,									х
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)						143 C					
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%		<u> </u>									
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%			18.3			S. Salara G. Salara					

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ICI]	CP-M	S	•	GFA/	A	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	X									X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	Mary Mary Co.									X	-	
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х				i i i i i i i i i i i i i i i i i i i						X	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									Х	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									x	

Note: Several target analyte values were detected above the IDL in the field blank; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

								ICP		I	CP-M	S	(GFA.A	1	CV	'AA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1					t least twice every uent) for ICP-MS		he		х									
5.2	Are the IC	S AB recover	ies within 80% -	120%?			7.1 ₀		х									
5.3	Are the re	sults for unspi	ked analytes (in	ICS A) < + IDL	?				х									
5.4	If not, are ICS?	the associated	d sample Al, Ca,	Fe, and Mg co	ncentrations less t	han the level in t	he		x									
	Action:	Not Spik	ced Analytes	Spike	d analytes (ICS AI	3 analytes)												
		< -IDL	> IDL	< 50%	50% - 79%	> 120%												
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

			ICP		I	CP-M	S		3FAA	C	VAA-I	I g
		Yes	No 3	NA	Yes	No	NA	Yes	No N	A Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X		i i						х		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		x								х	
	Action: Solid Aqueous							·			## (1.00 E)	
	< LCL > UCL < 50% 50% - 79% > 120%		89.52° 24.5°	Ť								
	J(+)/UJ(-) J(+) R(+/-) J(+)/UJ(-) J(+)					11.2						

Note:

7.0 Laboratory Duplicates (Code K)

				ICP		I	CP-M	S	C	GFAA	1	C	VAA-	Hg
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11		Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,								П				
		per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes	x									X		ı
 		not associated with Duplicate results.								1 1				ı
		Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional									T		7.4	
		judgment. Note in worksheet.		Α				li					X	
1	73	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for									Winds.			
	1.5	aqueous, and RPD < 35% or difference < +2 X PQL for solids)? Action: If no, J(+).	X	l							100	X		
L		Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

8.0 Spike Sample Analysis - Pre-Digestion (Code M - Recovery, Code D - RPD)

					ICP]	CP-M	S	(GFA.	4	CV	VAA-	Hg
				Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	Was a spiked sample prepared a batch, per matrix and per level)?		equency (one per 20 samples, per												
0.1	associated with matrix spike resu		oressional judgment, analytes not	X			i usuon ii yhyk saake						X		
8.2	Was a field blank used for the M Note in worksheet.	IS analysis? Action: If yes,	J(+) with professional judgment.		Х									х	
	Note: Matrix spike analysis ma sample in an SDG.	y be performed on a field b	lank when it is the only aqueous												
8.3	For all analytes with sample conc the control limit of 75-125%? (spike concentration.)				x								x		
	%R > 125%	30% < %R < 74%	%R < 30%	30/35											
	Positive J	J	J												

ote: Sample AA-P-4-82 was spiked and analyzed as the MS/MSD. Potassium was recovered outside limits for the MS/MSD sample. Qualifications are listed below.

Field ID	Analyte	MS/MSD/RPD Values	MS/MSD/RPD Limits
AA-P-4-82	Potassium	129/132/1	75-125/20

Field ID	Analyte	Qualification	Code
AA-P-4-82	Potassium	J	M

9.0 Instrument Detection Limits (IDL)

		ICP		I	CP-M	S,		GFA.	Ā	CV	/AA-	Hg
Y	es	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1 Are all IDL equal to or less than the reporting limits specified?			X									x

10.0 ICP Serial Dilutions (Code S)

			ICP		1	CP-M	S		GFA.	1	C	VAA-	-Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	X											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50×10^{-5} x the IDL in the original sample? If no, $J(+)$.	X											

Note: Sample AA-Q-10-18 was diluted and analyzed with all RPD values within QC limits.

11.0 Field Duplicate Samples (Code F)

			ICP		I	CP-M	S	(GFA/	A	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	X									x		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< +2 \times PQL$ and For solids, RPD $< 100\%$ or difference $< +4 \times PQL$)	X.									x		

Note: Sample AA-Q-10-18 was the parent sample to AA-Q-10-18-D

12.0 Result Verification (Code Q)

			ICP		Ī	CP-M	S	(GFA.	4	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									х
12.2	Were all dilution reflected in the positive results and detection limits?			х	. N. 4				_				X

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
13.2	Number of samples:	12	0	0	12
13.3	Number of target compounds in each analysis:	22	0		1
13.4	Number of results rejected and not reported:	0	0		
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			1	ſ <u></u>
Notes	% Completeness	100	####	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

8/19/2005 Date:

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 013

Test Name: Method No.: Ammonia

350.1

Review Level:

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

SA-Q-10-FB

AA-P-4-82

AA-P-4-102

AA-Q-10-18

AA-Q-10-18-D

AA-P-4-112

AA-Q-10-38

AA-P-9-34

AA-Q-10-58

AA-Q-10-78

AA-P-9-54

AA-Q-10-94

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		-
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

No problems were noted in the laboratory case narrative.

2.0 Holding Time/ Preservation (Code H)

I 		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, $J(+)/UJ(-)$.		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			-
3.4	If Level IV, review raw data and verify all detections for blanks were reported.		÷ ,,,	x

Note:

4.0 Initial Calibration (Code C)

·		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			Х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	//////////////////////////////////////		-
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

5.0 Continuing Calibration (Code R)

-		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			X
5.2	Has a continuing calibration standard been analyzed every 10 samples?			х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

r		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	x		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

8.0 Analyte Identification

		Yes	No	NA
	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			х
3.7				<u> </u>

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			Y
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	**************************************	Vi carren	v
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			
			<u> </u>	ł ·

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample AA-Q-10-18 was the parent sample to AA-Q-10-18-D

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, $J(+)$, with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	X		

Note:

12.0 Data Completeness

<u> </u>			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP sample)	or use 95% for aqueous sample, 90% for soil	x		
12.2	Number of samples:	12			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100			<u> </u>

			· ·	

DATA VALIDATION WORKSHEET **VOLATILE ORGANIC ANALYSIS**

Reviewer:

Date:

Bart Brandenburg

8/24/2005

Severn Trent Laboratory - Savannah Laboratory

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011 SAS 014

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

VAA-8-26 VAA-8-86 AA-P-9-114 VAA-6-38 UAA-9-110 TB-15

VAA-8-46 AA-P-9-74

AA-P-9-126 VAA-6-58

UAA-9-121

VAA-8-66

AA-P-9-94

VAA-6-18 TRIP BLANK

AA-0-5-102

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		-
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X	-	
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservat	ion, collection and stor	age condition meet m	ethod requirement?	Х		
	temperature is outsic		frozen) to 10° flag al	. <2° >6°C, etc.), comment in report. If unpreserved or l positive results with a "J" and all non-detects "UJ". If ects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days	- 		
		Yes	14 days	14 days			
	Soil/Sediment	4 °C ± 2 °C	14 days	14 days			
2.3	Have any technical h	olding times been gros	sly (twice the holding	time) exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	+		v

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			Х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		·	
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			х

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			Х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/UJ(-). For %D > 50%, flag R.			-
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			x

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samp	les listed on the ap	propriate Surrogate Recovery	Summary Form ?	X	-	
7.2	Are surrogate	e recoveries within	acceptance criteria specified i	n the QAPP for all samples?	Ñ		†·····
7.3	If No in Sect		<u> </u>	x			
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
	Note: If SM reanalysis is		ot meet acceptance criteria in sa	imples chosen for the MS/MSD or diluted samples, then no			
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		Х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		 -
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.		iv) 27	
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal stan	dard areas for every sample	and blank within upper an	d lower QC limits?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J		<u> </u>	
	Non-detect	None	UJ	R			
Note:	continuing calib	cification is for the continuing ration. Thus, if all other QC viewer may choose not to fl	specifications are met for:	ed to the mid-point initial calibration a given sample, using informed prof s case.	n, not sample to ressional		
10.2	Are retention tim	nes of internal standards wit	hin 30 seconds of the assoc	iated calibration standard?	X		
	Action: The chr magnitude, the re	omatogram must be examin eviewer may consider partia	ed to determine if any false Il or total rejection of the da	positives or negatives exist. For shit ta for non-detects in that sample/frac	ift of a large ction.		

Note:

11.0 TCL Identification (Code W)

r==			Yes	No	NA
	11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
L	11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?		-	x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations		M	

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	% completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil mple)		x		
14.2	Number of samples:	16			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Date:

Laboratory

8/24/2005

Severn Trent Laboratory - Savannah

Project Name:

Sauget - Area 2

Project Number:

21561510.60011 **SAS 014**

Review Level:

SDG No.:

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on surrogate, internal standard, LCS recoveries, and method blank contamination.

Field IDs:

VAA-8-26

VAA-8-46

VAA-8-66

VAA-8-86

AA-P-9-74

AA-P-9-94

AA-P-9-114

AA-P-9-126

VAA-6-18

VAA-6-38

VAA-6-58

UAA-9-110

UAA-9-121

AA-0-5-102

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The method blank had recoveries above the MDL.

The MS/MSD and LCS had recoveries outside QC limits.

The surrogate and internal standard analytes had recoveries outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1				
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	X		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?	1	X	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.		1800	
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	1		x

Note: The method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
AA-P-9-126	Indeno[1,2,3-cd]pyrene	-	U	Z
AA-P-9-126	Benzo[g,h,i]perylene	-	Ŭ	Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		distriction of the second	
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.		122000000000000000000000000000000000000	x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	***************************************		x

Note:

6.0 Continuing Calibration (Code C)

 		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?		-	Х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			X
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.	·		х
			<u> </u>	

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7.1	Are all samp	les listed on the a	opropriate Surrogate Recovery S	Summary Form ?		Х		
7.2	Are surrogate	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?				х		
7.3	Are more tha	n one of either fra	ction outside the acceptance crit	eria?		x		
7.4	If Yes in Sec	tion 7.3, are these	sample(s) or method blank(s) re	analyzed?			х	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?						x	
		C recoveries displed neutrals are ass		e MS and/ or diluted samp	eles, then no reanalysis is required and			
		> UCL	10% to LCL	< 10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				

Note: Surrogate recoveries were outside QC limits. Qualification are listed below.

Field ID	Surrogate	Surrogate recoveries	Surrogate limits
VAA-8-46	2FP, PHL	49 / 39	56-100 / 55-104
VAA-8-66	2FP	101	56-100
AA-P-9-114	2FP, NBZ, PHL	112 / 108 / 112	56-100 / 60-102 / 55-104
VAA-6-38	PHL	48	55-104
UAA-9-121	2FP	101	56-100

2FP=2-Fluorophenol, NBZ=Nitrobenzene-d5, PHL=Phenol-d5

Field ID	Analyte	Qualification	Code
VAA-8-46	All Acid/fraction analytes	J/UJ	S
AA-P-9-114	All Acid/fraction analytes	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	Х	•	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		Х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Several analytes were outside QC limits for the MS/MSD sample, however the LCS for these analytes was within QC limits. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.			x

Note:

Several analytes were outside QC limits for the LCS. Qualifications are listed below.

Field ID	Analyte	LCS recoveries	LCS limits
LCS 680-11311	Phenol	127	46-106
LCS 680-11311	Bis(2-Chloroethyl)ether	124	48-108
LCS 680-11311	2-Chlorophenol	119	54-106
LCS 680-11311	1,3-Dichlorobenzene	101	38-97
LCS 680-11311	1,4-Dichlorobenzene	97	40-92
LCS 680-11311	1,2-Dichlorobenzene	104	42-98
LCS 680-11311	2-Methylphenol	118	57-110
LCS 680-11311	3 & 4 Methylphenol	119	49-114
LCS 680-11311	Hexachloroethane	92	35-89
LCS 680-11311	Nitrobenzene	123	57-110
LCS 680-11311	Isophorone	117	60-113
LCS 680-11311	2-Nitrophenol	118	59-114
LCS 680-11311	2,4-Dichlorophenol	114	62-112
LCS 680-11311	2,4,6-Trichlorophenol	124	61-118
LCS 680-11311	2-Chloronaphthalene	113	58-111
LCS 680-11311	2-Nitroaniline	134	60-122
LCS 680-11311	4-Bromophenyl phenyl ether	115	50-112
LCS 680-11311	Hexachlorobenzene	124	60-122
LCS 680-11311	Pyrene	146	49-135
LCS 680-11311	Benzo[b]fluoranthene	135	44-130

Field ID	Analyte	Qualification	Code
AA-P-9-74	2-Chlorophenol	J	L
AA-P-9-94	2-Chlorophenol	J	· L
AA-P-9-114	2-Chlorophenol	J	L
AA-P-9-114	1,4-Dichlorobenzene	Ј	L
AA-P-9-114DL	2-Chlorophenol	J	L
AA-P-9-126	2-Chlorophenol	J	L
AA-P-9-126	1,4-Dichlorobenzene	J	L
AA-0-5-102	2-Chlorophenol	J	L

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal star	ndard area of every sample a	nd blank within upper and l	ower QC limits for each conti	inuing calibration?		х	
		Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R		<u> </u>	•	
Note:	continuing calib	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention tin	nes of internal standards wit	hin 30 seconds of the associ	iated calibration standard?		X		
	Action: The chr the reviewer ma	omatogram must be examin y consider partial or total rej	ed to determine if any false ection of the data for non-d	positives or negatives exist. letects in that sample/fraction.	For shift of a large magnitude,			

Note: Several samples had internal standards outside QC limits. Qualifications are listed below.

Field ID	Analyte	IS Recovery High/Low	Qualification	Code
AA-P-9-114	All SVOCs	Low	J/UJ	I
VAA-8-66	All SVOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			х

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

n		·	Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95%	for aqueous sample, 90% for soil sample)	X		
14.2	Number of samples:	14			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				·
	% Completeness	100		-	

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date: 8

8/24/2005

Project Number:

Review Level:

21561510.60010

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 014 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on blank contamination.

Field IDs:

VAA-8-26	VAA-8-46
VAA-8-86	AA-P-9-74
AA-P-9-114	AA-P-9-126
VAA-6-38	VAA-6-58
UAA-9-121	AA-0-5-102

VAA-8-66

AA-P-9-94 VAA-6-18

UAA-9-110

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the method blank had detections above the MDL.

Although it is beyond the scope of this review, it should be noted that the ICAL and CCV had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
2.2	Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

 		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?	X		
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			х

Note: The method blank had a detection above the MDL for pentachlorophenol. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
VAA-8-26	Pentachlorophenol	-	U	Z
VAA-8-66	Pentachlorophenol	0.6	U	Z
AA-P-9-94	Pentachlorophenol	0.27	U	Z
AA-P-9-114	Pentachlorophenol	-	Ŭ	Z
VAA-6-18	Pentachlorophenol	0.3	U	Z

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			Х

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			Х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			Х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			x

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed	on the appropriate Surrogate Recovery	Summary Form ?	x		
6.2	Are surrogate recover	ies within acceptance criteria specified	in the QAPP for all samples?	X		
6.3	If No in Section 6.2, v	were these sample(s) or method blank(s) reanalyzed?	V		x
6.4	If No in Section 6.3, is	s any sample dilution factor greater tha	n 10? (Surrogate recoveries may be diluted out.)		-	x
	> UCI	L 10% to LCL	< 10%			
	Positive J	· J	J			
	Non-detect None	UJ	R			

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	x		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
9.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
<u> </u>				L

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			X

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		х	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		х	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
12.2	Number of samples:	14			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	100			

Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2				
Date:	8/24/2005	/2005 Project Number:					
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS014				
		Review Level:	Level III	-			
Major Anom	alies:		· · · · · · · · · · · · · · · · · · ·				
	No samples were rejected						
Minor Anom	alies:						
	Samples were qualified based on MS/MSD recoveries.						
Field IDs:	VAA-8-26	VAA-8-46	VAA-8-66				
	VAA-8-86	AA-P-9-74	AA-P-9-94				
	AA-P-9-114	AA-P-9-126	VAA-6-18				
	VAA-6-38	VAA-6-58	UAA-9-110				

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP		ICP-MS		MS GFAA		4	CVAA-H		Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	х									х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									х		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?											x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: ${}^{4}C \pm 2 {}^{0}C$)	X									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	X									X		

AA-0-5-102

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

UAA-9-121

2.0 Holding Time (Code h)

			ICP		ICP-	MS		GFA/	1	C/	/AA-H	łg
		Yes	No	NA	Yes N	o NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x						·	-	х	
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.											

Note:

3.0 Instrument Calibration (Code c)

							ICP		IO	CP-M	IS		GFA.	4	CV	AA-	Hg
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand				blank + one standard;			х									
3.2	Are the correlation coeffici	ients > 0.995	? (for GFAA and	CVAA) Action: J((+)/UJ(-).												х
3.3	Was an initial calibration v If no, use professional judg	gment to dete	rmine affect on th	e data and note in	reviewer narrative.			х									х
3.4	Was continuing calibration whichever is more frequen data and note in reviewer n	t? Action: I arrative.	f no, use profession	onal judgment to de	etermine affect on the			х									x
3.5	Are all calibration standard (80%-120%) and other Me			CCV) within the co	ntrol limits? Mercury			х									х
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)												
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%												

4.0 Blanks (Code o - Calibration blank failure, Code p - Preparation blank failure, Code x - Field blank failure)

			ICP		I(CP-M	1S		GFA.A	1	CV	/ AA-]	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										X	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									х		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										x		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									х	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									X	

Note: All samples associated with the blank contamination were greater than 5X the blank concentration. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code n)

								ICP		I	CP-M	IS		GFA	١	C/	/AA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1	Was ICS	AB analyzed a	t beginning of ea	ach ICP run (or	at least twice ever	ry 8 hours), and at the			Ţ									
					ent) for ICP-MS?)			X					l				
5.2	Are the IC	S AB recoveri	es within 80% -	120%?					Х					1				
5.3	Are the res	sults for unspil	ked analytes (in I	(CSA) < + IDL?					х									
5.4	If not, are	the associated	sample Al, Ca, F	e, and Mg conc	entrations less that	n the level in the ICS?			х									
•	Action:	Not Spik	ed Analytes	Spiked	analytes (ICS AB	analytes)												
		<-IDL	> IDL	< 50%	50% - 79%	> 120%												
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

6.0 Laboratory Control Sample (LCS) (Code 1 - Recovery, Code e - RPD)

								ICP		IC	P-MS	S	G]	AA	C	VAA-	Hg
							Yes	No	NA	Yes	No I	NA Y	es 1	No N	A Yes	No	NA
6.1				the correct frequ (+) any sample n) samples, per batch, per h LCS results.	x								X		
6.2		recovery outsions: as per EPA-E		limits? (Aqueou	s limits: 80% - 1	20% - except Ag and Sb;		Х								х	
	Action:	Sc	olid		Aqueous												
		< LCL	> UCL	< 50%	50% - 79%	> 120%											
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)											

Note:

7.0 Laboratory Duplicates (Code k)

				ICP		I	CP-M	1S		GFA.	4	CV	AA-	Hg
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
		Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,												
l		per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	x				1					х		
<u>L</u>		associated with Duplicate results.					1							l
l	7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional								10 / 20 A				
<u> </u>		judgment. Note in worksheet.		X					•		1		X	
#	7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for												
1		aqueous, and RPD < 35% or difference $\leq \pm 2$ X PQL for solids) Action: If no, $J(\pm)$.	X									Х		
<u> </u>		Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

8.0 Spike Sample Analysis -Pre-Digestion (Code m - Recovery, Code d - RPD)

					<u> </u>	ICP		I	CP-M	1S		GFA.	4	C	VAA-	·Hg
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	batch, per ma associated wit	trix and per level)? h matrix spike results	Action: If no, J(+), with ps.	requency (one per 20 samples, porofessional judgment, analytes r	ot x									X		
8.2	Note in works	heet		s, $J(+)$ with professional judgme	ľ	X									X	
	sample in an S		or personned on a meta c	main when it is the only aqueo	us											i
8.3	For all analyte the control lim concentration.	it of 75-125%? (No	ntration < 4 x spike concen control limit applies to anal	stration, are spike recoveries with tytes with concentration > 4 x spi	in ce	х								Х		
		%R > 125%	30% < %R < 74%	%R < 30%												
	Positive	J	J	J					_			-				
	Non-detect	None	UJ	R						<u> </u>						

Note: The MS/MSD recovered chromium outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
VAA-8-46	Chromium	83/65	75-125

Field ID	Analyte	Qualification	Code
VAA-8-46	Chromium	J	M

9.0 Instrument Detection Limits (IDL)

		ICP		I	CP-M	1S		GFA.	4	CV	AA-	Hg
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1 Are all IDL equal to or less than the reporting limits specified?			x									x

10.0 ICP Serial Dilutions (Code s)

			ICP		I	CP-M	(S	'	GFA.	1	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x			35.30								
10.2	Was a five-fold dilution performed?	X										-	
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, $J(+)$.	X											

Note: Sample VAA-8-26 was diluted and reanalyzed.

11.0 Field Duplicate Samples (Code f)

				ICP		10	CP-M	1S		GFA.	1	CV	AA-l	Hg
_			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
L	11.1	Were any field duplicates submitted for metal analysis?		х									х	
	11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< +2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< +4 \times PQL$)			х									х

Note:

12.0 Result Verification (Code Q)

		ICP		ICP		CP-M	IS	(GFA.	7	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									х
12.2	Were all dilution reflected in the positive results and detection limits?			х									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
13.2	Number of samples:	14	 0	 0	 14
13.3	Number of target compounds in each analysis:	22	0	0	1
13.4	Number of results rejected and not reported:	0	0	 0	 0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100	####	####	 100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Date:

Bart Brandenbug

8/24/2005

Severn Trent Laboratory - Savannah

Laboratory Test Name:

Ammonia

350.1

Method No .:

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 014

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on blank contamination and MS/MSD recoveries.

Field IDs:

VAA-8-26 VAA-8-86

AA-P-9-114 VAA-6-38

UAA-9-121

VAA-8-46

AA-P-9-74

AA-P-9-126

VAA-6-58

AA-0-5-102

VAA-8-66

AA-P-9-94

VAA-6-18

UAA-9-110

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding	0 Holding Time/ Preservation (Code H)		No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		· · · · · · · · · · · · · · · · · · ·
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?	х		
3.3	Do any field/rinse/equipment blanks have positive results?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.		**************************************	
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	New RL	Qualification	Code
VAA-8-46	Ammonia	0.06	U	Z

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?		<u> </u>	x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			
4.3	The Level 14, recalculate the correlation coefficient to verify correct calculations are being made.			

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

[Yes	No	NA.
<u>L</u>	6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
	6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		-
	6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		X	
		Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/ MSD recoveries	MS/MSD Limits
VAA-8-46	Ammonia	56/56	90-110

Field ID	Analyte	Qualification	Code Code
VAA-8-46	Ammonia	UJ	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			X
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

Note:

8.0 Analyte Identification

_			Yes	No	NA
	Q 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT	4.0		
L	8.1	in the continuing calibration?			X

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA.
9.1	Are RLs used consistent with those specified in the QAPP?			X
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			Х
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		х	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and			
11.1	per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	X		

Note:

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or sample)	eteness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil			
12.2	Number of samples:	14			
12.3	Number of target compounds in each analysis:	1			1
12.4	Number of results rejected and not reported:	0	1		
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$		 	· · · · · · · · · · · · · · · · · · ·	
	% Completeness	100			

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:

Achintya Bezbaruah

Project Name:

Sauget - Area 2

Date:

8/29/2005

Project Number:

Review Level:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS015 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Some analytes required qualifications, based on LCS/LCSD recoveries.

Field IDs:

SA-Q-12-SS-0.5

AT-Q-36-SS-0.5

SA-Q-12-SB-6

AT-Q-SB-5

SA-Q-16-SS-0.5

AT-Q-35-WS-8'

SA-Q-16-SB-3

AT-Q-35-SS-0.5

AT-Q-36-SB-6

AT-Q-35-SB-6'

1.0 Chain of Custody/Sample Condition

			Yes	No	NA
L	1.1	Do Chain-of-Custody forms list all samples analyzed?	Х		
L	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
	1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	х		

Note:

LCS/LCSD recoveries for some samples were outside the control limits.

Internal standard recoveries were outside the control limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservat	ion, collection and sto	rage condition meet m	ethod requirement?	x		
	temperature is outsic		t frozen) to 10° flag a	, <2°>6°C, etc.), comment in report. If unpreserved or ll positive results with a "J" and all non-detects "UJ". It tects "R".			
2.2	Have any technical h	olding times, determine	ned from sampling to	date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	4 °C_±2 °C	14 days	14 days			
2.3	Have any technical h	olding times been gro	ssly (twice the holding	g time) exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			х
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			х

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7.1	Are all sampl	es listed on the ap	propriate Surrogate Recovery S	ummary Form ?		X		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples?		X		-
7.3	If No in Sect	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						х
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			t.)			х	
		Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.						
		> UCL	10% to LCL	< 10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		•	х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: LCS recoveries for 1,1-Dichloroethane were outside QC limits. See qualification below:

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-12086	1,1-Dichloroethane	31/38	43-157
LCS 680-12190	Acetone	20/ -	28-143

Field ID	Analyte	Qualification	Code
SA-Q-12-SS-0.5	1,1-Dichloroethane	UJ	L
SA-Q-12-SB-6	1,1-Dichloroethane	UJ	L
SA-Q-16-SS-0.5	1,1-Dichloroethane	UJ	L
SA-Q-16-SB-3	1,1-Dichloroethane	UJ	L
AT-Q-36-SB-6	1,1-Dichloroethane	UJ	L
AT-Q-36-SS-0.5	1,1-Dichloroethane	UJ	L
AT-Q-SB-5	Acetone	UJ	L
AT-Q-35-WS-8'	Acetone	J	L

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal star	ndard areas for every sample	and blank within upper an	d lower QC limits?		x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	continuing calib	cification is for the continuing pration. Thus, if all other QC y choose not to flag individu	specifications are met for	ed to the mid-point initial calibrati a given sample, using informed pr	on, not sample to ofessional judgment,		
10.2	Are retention tin	nes of internal standards wit	hin 30 seconds of the assoc	iated calibration standard?	X	_	
	Action: The chr magnitude, the r	romatogram must be examin reviewer may consider partia	ed to determine if any false l or total rejection of the da	positives or negatives exist. For a positives or negatives exist. For a positive pos	shift of a large		

Note: One sample had internal standards below QC limits. Qualifications are listed below.

Field ID	Analyte	IS recovery High/Low	Qualification	Code
SA-Q-12-SB-6	All VOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			X

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				-
	% Completeness	100		•	

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

9/6/2005

Project Number:

Review Level:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 015 Level III

Major Anomalies:

Samples were rejected based on holding time criteria.

Minor Anomalies:

Samples were qualified based on MS/MSD, LCS, surrogate, and internal standard recoveries.

Field IDs:

SA-Q-12-SS-0.5

AT-Q-36-SS-0.5

SA-Q-12-SB-6

AT-Q-SB-5

SA-Q-16-SS-0.5

AT-O-35-WS-8'

SA-Q-16-SB-3

AT-Q-35-SS-0.5

AT-Q-36-SB-6

AT-Q-35-SB-6'

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated that the surrogate, LCS/LCSD, MS/MSD, and internal standard recoveries for several samples were outside of control limits.

The narrative also indicated that samples were reanalyzed outside holding time.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	Х		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler	r was		
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Time Table for sample holding time) If yes, J(+)/UJ(-).	Holding x		O CONTRACTOR OF THE CONTRACTOR
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			1
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		

Note: Two samples were re-extracted outside of holding time. Qualifications are listed below.

Field ID	Analyte	Qualification	Days Late	Code
SA-Q-16-SS-0.5RE	All SVOCs	R	35	Н
SA-Q-16-SB-3RE	All SVOCs	R	35	Н
AT-Q-36-SB-6RE	All SVOCs	R	35	Н
AT-Q-36-SS-0.5RE	All SVOCs	R	35	Н
AT-Q-SB-5RE	All SVOCs	R	33	Н
AT-Q-35-WS-8REDL	All SVOCs	R	34	Н
AT-Q-35-WS-8RE	All SVOCs	R	34	Н
AT-Q-35-SS-0.5RE	All SVOCs	R	34	Н

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?	662		х
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

 		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U' and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	-33.00		Х .
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?	Section 1975		х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			х.
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, fla R.	5		
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			х
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.		**************************************	

7.0 Surrogate Recovery (Code S)

						Yes	No	NA
7.1	Are all samp	Are all samples listed on the appropriate Surrogate Recovery Summary Form?				X		
7.2	Are surrogate	surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?					х	
7.3	Are more tha	Are more than one of either fraction outside the acceptance criteria?			х	er kantigerate der Kanti		
7.4	If Yes in Sect	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?					х	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?				х			
			lay unacceptable recoveries in the eutrals are assessed separately.	e MS and/ or diluted sam	ples, then no reanalysis is			
		> UCL	10% to LCL	< 10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-16-SS-0.5	2FP, PHL, NBZ, FBP	22 / 27 / 29 / 36	36-101 / 38-102 / 33-94 / 38-104
AT-Q-36-SS-0.5	2FP, FBP, NBZ, PHL, TBP, TPH	11 / 19 / 15 / 14 / 16 / 24	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
AT-Q-SB-5	2FP, PHL, NBZ	25 / 33 / 32	36-101 / 38-102 / 33-94
AT-Q-35-WS-8	2FP, FBP, NBZ, PHL, TPH	15 / 27 / 20 / 21 / 34	36-101 / 38-104 / 33-94 / 38-102 / 40-129
AT-Q-35-SS-0.5	2FP, FBP, NBZ, PHL	23 / 33 / 27 / 28	36-101 / 38-104 / 33-94 / 38-102

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP=2,4,6-Tribromophenol, TPH=Terphenyl-d14

Field ID	Analyte	Qualification	Code
SA-Q-16-SS-0.5	All SVOCs	J/UJ	S
AT-Q-36-SS-0.5	All SVOCs	J/UJ	S
AT-Q-SB-5	All Acid/fraction SVOCs	J/UJ	S
AT-Q-35-WS-8	All SVOCs	J/UJ	S
AT-Q-35-SS-0.5	All SVOCs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other			
	QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10%			
	may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample SA-Q-16-SS-0.5 had 61 of its 65 analytes outside QC limits. Qualifications are listed below.

Field ID	Analyte	Number of analytes out	Total number of analytes	Qualification	Code
SA-Q-16-SS-0.5*	All SVOCs	61	65	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

 		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		х	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.		-	

Note: The LCS sample had several analytes outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-11834	2,4-Dinitrophenol	34	40-112
LCS 680-11834	2,4-Dichlorophenol	40	43-108
LCS 680-11834	1,2,4-Trichlorobenzene	35	36-98
LCS 680-11834	Hexachlorobutadiene	31	42-105
LCS 680-11834	2,4,6-Trichlorophenol	43	44-113
LCS 680-11834	2,4,5-Trichlorophenol	43	46-116
LCS 680-15248	2,4-Dinitrophenol	0	1-131
LCS 680-15248	Pentachlorophenol	1	27-116

Field ID	Analyte	Qualification	Code
SA-Q-12-SS-0.5	2,4-Dinitrophenol	UJ	L .
SA-Q-12-SS-0.5	2,4-Dichlorophenol	UJ	L
SA-Q-12-SS-0.5	1,2,4-Trichlorobenzene	UJ	L
SA-Q-12-SS-0.5	Hexachlorobutadiene	UJ .	L
SA-Q-12-SS-0.5	2,4,6-Trichlorophenol	UJ	L
SA-Q-12-SS-0.5	2,4,5-Trichlorophenol	R	L
SA-Q-12-SS-0.5	Pentachlorophenol	R	L
SA-Q-12-SB-6	2,4-Dinitrophenol	UJ	L
SA-Q-12-SB-6	2,4-Dichlorophenol	UJ	L ·
SA-Q-12-SB-6	1,2,4-Trichlorobenzene	UJ	L
SA-Q-12-SB-6	Hexachlorobutadiene	UJ	L
SA-Q-12-SB-6	2,4,6-Trichlorophenol	UJ	L
SA-Q-12-SB-6	2,4,5-Trichlorophenol	R	L
SA-Q-12-SB-6	Pentachlorophenol	R	L
AT-Q-SB-5	2,4-Dinitrophenol	UJ	L
AT-Q-SB-5	2,4-Dichlorophenol	UJ	L
AT-Q-SB-5	1,2,4-Trichlorobenzene	UJ	L
AT-Q-SB-5	Hexachlorobutadiene	UJ	L
AT-Q-SB-5	2,4,6-Trichlorophenol	UJ	L
AT-Q-SB-5	2,4,5-Trichlorophenol	R	L
AT-Q-SB-5	Pentachlorophenol	R	L
AT-Q-35-WS-8	2,4-Dinitrophenol	UJ	L
AT-Q-35-WS-8	2,4-Dichlorophenol	UJ	L
AT-Q-35-WS-8	1,2,4-Trichlorobenzene	UJ	L
AT-Q-35-WS-8	Hexachlorobutadiene	UJ	L
AT-Q-35-WS-8	2,4,6-Trichlorophenol	UJ	L
AT-Q-35-WS-8	2,4,5-Trichlorophenol	R	L
AT-Q-35-WS-8	Pentachlorophenol	R	L
AT-Q-35-SS-0.5	2,4-Dinitrophenol	UJ	L
AT-Q-35-SS-0.5	2,4-Dichlorophenol	UJ	L

Field ID	Analyte	Qualification	Code
AT-Q-35-SS-0.5	1,2,4-Trichlorobenzene	UJ	L
AT-Q-35-SS-0.5	Hexachlorobutadiene	UJ	L
AT-Q-35-SS-0.5	2,4,6-Trichlorophenol	UJ	L
AT-Q-35-SS-0.5	2,4,5-Trichlorophenol	R	L
AT-Q-35-SS-0.5	Pentachlorophenol	R	L
AT-Q-35-SB-6	2,4-Dinitrophenol	UJ	L
AT-Q-35-SB-6	2,4-Dichlorophenol	UJ	L
AT-Q-35-SB-6	1,2,4-Trichlorobenzene	UJ	L
AT-Q-35-SB-6	Hexachlorobutadiene	UJ	L
AT-Q-35-SB-6	2,4,6-Trichlorophenol	UJ	L
AT-Q-35-SB-6	2,4,5-Trichlorophenol	R	L
AT-Q-35-SB-6	Pentachlorophenol	R	L

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal stan	ndard area of every sample ar	nd blank within upper and lo	ower QC limits for each contin	uing calibration?		х	
		Area $> +100\%$	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				
Note:	to continuing cal	cification is for the continuin libration. Thus, if all other (viewer may choose not to fla	C specifications are met for	d to the mid-point initial calibr r a given sample, using inform s case.	ration, not sample ed professional			
10.2	Are retention tim	nes of internal standards with	nin 30 seconds of the associa	ated calibration standard?		X		
	Action: The chromagnitude, the re	omatogram must be examine eviewer may consider partial	ed to determine if any false a or total rejection of the dat	positives or negatives exist. For a for non-detects in that sample	or shift of a large e/fraction.		•	

7 of 8

Note: Internal standards for several samples had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	IS recovery High/Low	Qualification	Code
AT-Q-35-SS-0.5	All detected SVOCs	High	J	I
SA-Q-16-SS-0.5*	All detected SVOCs	High	J	I

11.0 TCL Identification (Code W)

· · · · · · · · · · · · · · · · · · ·		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
11.1	continuing calibration?			X
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum;			
11.2	and do sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		-	x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations	***		

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		х	1
13.2	Were all RPD or absolute difference values within the control limits?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or sample)	use 95% for aqueous sample, 90% for soil	X		
14.2	Number of samples:	10			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100		_	

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer:

Bart Brandenburg

Date:

9/7/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561511.60011 SAS 015

Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate and MS/MSD recoveries.

Field IDs:

SA-Q-12-SS-0.5

SA-Q-12-SB-6

SA-Q-16-SS-0.5

SA-Q-16-SB-3

AT-Q-36-SB-6

AT-Q-36-SS-0.5

AT-Q-SB-5

AT-Q-35-WS-8

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that surrogate and MS/MSD recoveries were outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

 		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	Х		
3.2	Do any method blanks have positive results (TCL)?		х	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	Yes	Yes
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?	, And		х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the ap	propriate Surrogate Recovery S	Summary Form ?	x		
7.2	Are surrogate recoveries within	acceptance criteria specified in	the QAPP for all samples?		х .	
7.3	If No in Section 7.2, were these	e sample(s) or method blank(s)	reanalyzed?	0	*	х
7.4	If No in Section 7.3, is any sam	ple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)			x
	> UCL	10% to LCL	< 10%		 -	
	Positive J	J [·]	J			
	Non-detect None	UJ	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-Q-16-SS-0.5	Decachlorobiphenyl-13C12	15	30-130
SA-Q-16-SB-3	Decachlorobiphenyl-13C12	16	30-130
AT-Q-36-SB-6	Decachlorobiphenyl-13C12	17	30-130
AT-Q-36-SS-0.5	Decachlorobiphenyl-13C12	16	30-130
AT-Q-35-WS-8	Decachlorobiphenyl-13C12	20	30-130
AT-Q-36-SB-6	Tetrachloro-m-xylene	27	30-150

Field ID	Analyte	Qualification	Code
SA-Q-16-SS-0.5	All PCBs	J/UJ	S
SA-Q-16-SB-3	All PCBs	J/UJ .	S
AT-Q-36-SB-6	All PCBs	J/UJ	S
AT-Q-36-SS-0.5	All PCBs	J/UJ	S
AT-Q-35-WS-8	All PCBs	J/UJ	S
AT-Q-36-SB-6	All Pesticides	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		-
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample SA-Q-16-SS-0.5 was analyzed as the MS/MSD sample. 9 out of 9 MS/MSD recoveries were outside QC limits. Qualifications are listed below.

Field ID Analyte	Qualification	Code
SA-Q-16-SS-0.5* All PCBs	J/UJ	M

9.0 Laboratory Control Sample (LCS/LCSD) (Code 1 - LCS recovery Code e - RPD)

		Yes	Yes	Yes
9.1	Is an LCS recovery form present?	Х		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	х		
9.4	If Level IV, verify the % recoveries are calculated correctly.			х
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

10.0 TCL Identification (Code W)

			Yes	Yes	Yes	۱
1	10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the				ı
١	10.1	continuing calibration?			X	ı

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

	·	Yes	Yes	Yes
11.1	Are RLs used consistent with those specified in the QAPP?			х
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		Х	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or usample)	se 95% for aqueous sample, 90% for soil	x		
13.2	Number of samples:	8			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Bart Brandenburg

Date:

9/7/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60010

SAS 015 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

SA-Q-12-SS-0.5

SA-Q-12-SB-6

SA-Q-16-SS-0.5

SA-Q-16-SB-3

AT-Q-36-SB-6

AT-Q-36-SS-0.5

AT-Q-SB-5

AT-Q-35-WS-8

AT-Q-35-SS-0.5

AT-Q-35-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	Х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
1.5	analytical problems or special circumstances affecting the quality of the data?		X	

2.0 Holding Time/ Preservation (Code h)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
2.2	Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

 		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		·
3.2	Do any method blanks have positive results?		х	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	\$1.000 \$100 \$100 \$100 \$100 \$100 \$100 \$10		
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Çalibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the a	ppropriate Surrogate Recovery	Summary Form ?	Х		
6.2	Are surrogate recoveries withi	n acceptance criteria specified i	in the QAPP for all samples?	x		
6.3	If No in Section 6.2, were thes	e sample(s) or method blank(s)	reanalyzed?			х
6.4	If No in Section 6.3, is any sar	nple dilution factor greater thar	10? (Surrogate recoveries may be diluted out.)			х
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			<u> </u>

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

9.0 TCL Identification (Code W)

		Yes	No	NA
0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing	1/2		
9.1	calibration?			X

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			Х
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

11.0 Field Duplicate Samples (Code F)		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		X	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		-	

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
12.2	Number of samples:	10			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)	·			
	% Completeness	100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2	
Date:	9/7/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 015	
		Review Level:	Level III	
Major Anoma	lion			

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on holding times and MS/MSD recoveries.

Field IDs:	SA-Q-12-SS-0.5	SA-Q-12-SB-16
	SA-Q-16-SS-0.5	SA-Q-16-SB-3
	AT-Q-36-SB-6	AT-Q-36-SS-0.5
	AT-Q-SB-5	AT-Q-35-WS-8
	AT-Q-35-SS-0.5	AT-Q-35-SB-6

1.0 Chain of	Chain of Custody/Sample Condition/Raw Data				IO	CP-M	(S	(GFA.	4	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									Х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	х									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	X									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.										x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that mercury was analyzed outside of holding time, and the method blank had detections above the MDL.

2.0 Holding Time (Code H)

		ICP			I	CP-M	(S		GFA.	4	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		Х								х		·
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.												

Note: Two samples for mercury analysis were analyzed outside QC limits. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
SA-Q-16-SB-3	Mercury	13	J	Н
AT-Q-36-SB-6	Mercury	13	UJ	Н

3.0 Instrument Calibration (Code C)

		•				ICP			IC	CP-M	[S		GFA	A	CV	AA-	Hg
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand				olank + one standard;			х									
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: J	(+)/UJ(-).												х
3.3	Was an initial calibration value of the second seco						х									х	
3.4	whichever is more frequen	as continuing calibration verification (CCV) performed every 10 analysis or every nichever is more frequent? Action: If no, use professional judgment to determine a data and note in reviewer narrative.															х
3.5	Are all calibration standa Mercury (80%-120%) and			and CCV) within	the control limits?			х									х
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)												
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%												$\neg \neg$

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		*	ICP		I	CP-M	1S	(GFA.	4	C/	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	X									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										X	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										X	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		X									x	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									X	

Note:

Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

							ICP			IC	CP-M	1S		GFA.	4.	C/	AA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1			t beginning of ea 8 hours (whiche		8 hours), and at 1	he		х										
5.2	Are the IC	S AB recover	ies within 80% -	120%?				х										
5.3	Are the res	ults for unspi	ked analytes (in I				x					1		_				
5.4	If not, are ICS?	Are the results for unspiked analytes (in ICS A) < + IDL? If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in ICS?													_			
	Action:	Not Spik	ed Analytes	Spiked	analytes (ICS AE	analytes)												
		<-IDL	> IDL	< 50%	50% - 79%	> 120%												
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)								 				

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

								ICP		IC	P-M	S	(GFA.	4	CV	/AA-	Hg
							Yes	No	NA Y	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1				samples, per batch, per LCS results.	X									X				
6.2		matrix and per level)? Action: If no, J(+) any sample not associated with LCS results. Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)						X									х	
	Action:	Sc	olid		Aqueous													
		< LCL	> UCL	< 50%	50% - 79%	> 120%												
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)				200								

Note:

7.0 Laboratory Duplicates (Code K)

				ICP		I	CP-M	IS		GFA.	4	C١	AA-	Hg
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
		Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,												
1	7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes	x									Х		
<u></u>		not associated with Duplicate results.												
	7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional	ŀ											
	7.2	judgment. Note in worksheet.		Х									Х	
	7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference $\leq \pm$ PQL for									\Box	TO THE STATE OF TH		
	7.5	aqueous, and RPD < 35% or difference $\leq \pm 2$ X PQL for solids) Action: If no, J(+).	X									Х		
L		Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	Million or a co											

Note: Samples AT-Q-36-SB-6 and SA-Q-12-SS-0.5 were analyzed in duplicate. All RPDs were within criteria.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

						ICP			I	CP-M	IS		GFA.	4	C/	/AA-	Hg
		·				Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	8.1	batch, per mat		Action: If no, J(+), with pro	quency (one per 20 samples, per ofessional judgment, analytes no	200000000000000000000000000000000000000									X		
}	8.2	Was a field bl Note in works		Sanalysis? Action: If yes,	J(+) with professional judgment		x									X	
		Note: Matrix sample in an S		be performed on a field bl	ank when it is the only aqueous	5											
	8.3	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)													X		
			R > 125%	30% < %R < 74%	%R < 30%	ika A											
		Positive	J	J	J												
		Non-detect	None	UJ	R												

Note: Sample SA-Q-12-SS-0.5 was spiked and analyzed. Some recoveries were outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
SA-Q-12-SS-0.5	Antimony	34 / 35	75-125
SA-Q-12-SS-0.5	Barium	317 / 67	75-125
SA-Q-12-SS-0.5	Copper	114 / 50	75-125
SA-Q-12-SS-0.5	Lead	79 / 41	75-125
SA-Q-12-SS-0.5	Potassium	125 / 152	75-125

Field ID	Analyte	Qualification	Code
SA-Q-12-SS-0.5	Antimony	UJ	M
SA-Q-12-SS-0.5	Barium	Ј	M
SA-Q-12-SS-0.5	Copper	J	M
SA-Q-12-SS-0.5	Lead	J	M
SA-Q-12-SS-0.5	Potassium	J	М

9.0 Instrument Detection Limits (IDL)

		ICP		I	CP-N	1S		GFA.	A	CV	AA-l	Hg
	Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1 Are all IDL equal to or less than the reporting limits specified?			х									х

Note:

10.0 ICP Serial Dilutions (Code S)

			ICP		I	CP-M	IS		GFA.	A	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	х											
10.2	Was a five-fold dilution performed?	X											,
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, J(+).	X											

Note:

Samples SA-Q-12-SS-0.5, AT-Q-35-SS-0.5, and AT-Q-36-SB-6 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

				ICP		I	CP-M	IS	(GFA.	4	CV	/AA-	Hg
			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
L	11.1	Were any field duplicates submitted for metal analysis?		х									х	
	11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2$ x PQL and for solids, RPD $< 100\%$ or difference $< \pm 4$ x PQL)			х									х

Note:

12.0 Result Verification (Code Q)

			ICP		I	CP-M	IS	(GFA.	4	CV	/AA-)	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									x
12.2	Were all dilution reflected in the positive results and detection limits?			х									х

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
13.2	Number of samples:	10	 0	 0	 12
13.3	Number of target compounds in each analysis:	22	 0	0	1
13.4	Number of results rejected and not reported:	0	0	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100	####	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Bart Brandenburg

Date:

9/7/2005

Laboratory

Severn Trent Laboratory - Savannah

Test Name:

Ammonia

Method No.:

350.1

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 015

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

SA-Q-12-SS-0.5

SA-Q-12-SB-6

SA-Q-16-SS-0.5

SA-Q-16-SB-3

AT-Q-36-SB-6

AT-Q-36-SS-0.5

AT-Q-SB-5

AT-Q-35-WS-8

AT-Q-35-SS-0.5

AT-Q-35-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		x	

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated		·	
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	12.	X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	-	X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?	-	x	-
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			X
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			x

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		Х	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	2.2		х
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

<u> </u>		Yes	No	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		<u> </u>
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		-
7.4	If Level IV, verify the % recoveries are calculated correctly.		·	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

8.0 Analyte Identification

_			Yes	No	NA
	0 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in			
8.1	0.1	the continuing calibration?			x
			84000		

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	***************************************		
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			+ x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		х	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% of difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate result are > 5 X IDL.	r S		х

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
12.2	Number of samples:	10			
12.3	Number of target compounds in each analysis:	1		·	
12.4	Number of results rejected and not reported:	0		••, •,	
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
<u> </u>	% Completeness	100			

			·	

DATA VALIDATION WORKSHEET **VOLATILE ORGANIC ANALYSIS**

Reviewer:

Date:

Amelia Turnell

Laboratory

10/13/2005

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 016

Level III

Major Anomolies:

No data was rejected

Minor Anomolies:

No qualification of data were required.

Field IDs:

UAA-8-106 UAA-8-106-D UAA-9-30 UAA-9-50 UAA-9-50-D UAA-9-70

UAA-9-90

UAA-6-78 AA-0-5-42-D

AA-05-62

UAA-6-98

AA-0-5-22

AA-0-5-42

TB-14

UAA-6-98-D

AA-0-5-82

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X	,.	-
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The case narrative indicated that the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

					Yes	No	NA
2.1	Do sample preservat	ion, collection and stor	age condition meet me	ethod requirement?	Х		
	temperature is ouside		frozen) to 10° flag all	<2° >6°C, etc.), comment in report. If unpreserved or positive results with a "J" and all non-detects "UJ". If ects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).				X		
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			•••
	Soil/Sediment	4 °C ± 2 °C	14 days	14 days			
2.3	Have any technical h	olding times been gros	ssly (twice the holding	time) exceeded? If yes, J(+)/R(-).		x	

Note:

All samples were analyzed within holding times.

3.0 GC/MS Instrument Performance Check (Code T)

	Yes	No	NA
Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x
	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)? Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)? Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.	 		

Note:

There were no detections.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			Х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			***
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			Х
6.6	If Level IV, calculate a sample of RFs and %Ds from ave RF to verify correct calculations.	†	2.6888888888	

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sampl	es listed on the ap	propriate Surrogate Recovery S	ummary Form ?	X		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples?	x		
7.3	If No in Secti	on 7.2, were these	sample(s) or method blank(s) r	eanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						x
	Note: If SMO reanalysis is		t meet acceptance criteria in san	nples chosen for the MS/MSD or diluted samples, then	no		
		> UCL	10% to LCL	< 10%			
ĺ	Positive	J	J	J			
	Non-detect	None	UJ	R			· · · · · · · · · · · · · · · · · · ·

Note:

All surrogate recoveries within evaluation criteria.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

(Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample UAA-6-78 was the MS/MSD client designated sample. Several compounds recovered low; however, no recoveries were <10%. The LCS was within QC limits; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	х		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,		-	
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

Note: All the LCS recoveries were within acceptance range.

10.0 Internal Standards (Code I)

			- <u>-</u>		Yes	No	NA
10.1	Are internal stan	dard areas for every sample	and blank within upper and	lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			<u> </u>
	Non-detect	None	UJ	R			
Note:	continuing calibi	cification is for the continuin ration. Thus, if all other QC eviewer may choose not to fl	specifications are met for a	d to the mid-point initial calibration, no given sample, using informed profession is case.	t sample to onal		
10.2	Are retention tim	nes of internal standards with	in 30 seconds of the associ	ated calibration standard?	X		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.		f a large				

Note: All internal standard area counts and retention times were within evaluation criteria.

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
	calibration?			Х
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
	do sample and standard relative ion intensities agree within 30%?		_	х

5 of 6

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations	-		

Note: TICs were not reported.

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	X		<u> </u>
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outsidethe acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.	200	*	

Note:

Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D.

Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use sample)	95% for aqueous sample, 90% for soil	X.		
14.2	Number of samples:	16		·	
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0	 		
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Amelia Turnell

Date:

10/14/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS016

Level III

Major Anomalies:

One sample was rejected due to low internal standards.

Minor Anomalies:

Some samples were qualified due to surrogates, MS/MSD, LCS and internal standard recoveries.

Field IDs:

UAA-8-106 UAA-8-106-D UAA-9-30 UAA-9-50 UAA-9-50-D UAA-9-90 UAA-6-78 AA-0-5-42-D

AA-05-62 UAA-6-98 AA-0-5-22

AA-0-5-42 UAA-9-70

UAA-6-98-D AA-0-5-82

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	v		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The case narrative indicated that surrogates, LCS and the MS/MSD had recoveries outside QC limits. In addition, internal standards also failed in one sample so it was reanalyzed.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	Х		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10°C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note: All samples were extracted and analyzed within holding time.

3.0 GC/MS Instrument Performance Check (Code T)

			Yes	No	NA
	3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
ľ	3.2	Have all samples been analyzed within twelve hours of the tune?			x
		If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
	3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
L		If no, all standards, blanks, field samples and QC samples are rejected "R".	***************************************		

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

	Yes	No	NA
Is a Method Blank Summary form present for each batch?	x		
Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
Do any field equipment blanks have positive results (TCL, and/or TIC)?			x
Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.	<u> </u>		
If Level IV, review raw data and verify all detections for blanks were reported.			
	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)? Do any field equipment blanks have positive results (TCL, and/or TIC)? Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.	Is a Method Blank Summary form present for each batch? Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)? Do any field equipment blanks have positive results (TCL, and/or TIC)? Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.	Is a Method Blank Summary form present for each batch? Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)? Do any field equipment blanks have positive results (TCL, and/or TIC)? Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.

Note: There were no detections.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

 		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $< 20\%$)?			х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.	300000 L 115235		
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.	-		x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

7.0 Surrogate Recovery (Code S)

		Yes	No	NA
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	x		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?			
7.3	Are more than one of either fraction outside the acceptance criteria?			
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?			
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?	 	x	
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.	1		
	> UCL 10% to LCL < 10%	 	 	
	Positive J J J	 	<u> </u>	
	Non-detect None UJ R		· · · · ·	

Note: A few surrogate recoveries were outside QC limits. Qualifications are listed below.

Field ID	Surrogate Recoveries	Surrogate	Surrogate Limits
UAA-9-30	39 / 239 /115 / 230 / 299	PHL / TBP / NBZ / FBP / TPH	55-104 / 55-126 / 60-102 /59-103 / 10-154
AA-05-62	107 / 103/ 107	PHL / 2FP / NBZ	55 -104 / 56 -100 / 60-102

PHL = Phenol-d5 2FP = 2-Fluorophenol TBP = 2,4,6-Tribromophenol NBZ = Nitrobenzene-d5 FBP = 2-Fluorobiphenyl TPH = Terphenyl-d14

Field ID	Analytes	Quals	Code
AA-05-62	Acid fraction (only detections)	J	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	х		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		-
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample UAA-6-78 was used as the MS/MSD. Three analytes were outside QC limits. 4-chloroaniline (also out in the LCS) and 3,3 dichlorobenzene (recoveries of <10%) were qualified and are listed below.

Field ID	Analytes	MS/MSD Recoveries	RPD	Quals	Code
UAA-6-78	4-chloroaniline	11 and 18 percent	44 and allowed is 40	UJ	М
UAA-6-78	3,3 dichlorobenzene	3 and 4 percent	Within QC limits	R	М

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.			
Note:	One LCS sample had 4-chloroaniline recovery of 18%. The range is 22 - 107. Qualifications are listed below.			-

One LCS sample had 4-chloroaniline recovery of 18%. The range is 22 - 107. Qualifications are listed below.

Field ID	Analytes	Qualification	Code
UAA-8-106	4-chloroaniline	UJ	$\mathbf{L}_{:}$
UAA-8-106-D	4-chloroaniline	, UJ	L
UAA-9-50	4-chloroaniline	UJ	L
UAA-9-50-D	4-chloroaniline	· UJ	L
UAA-9-70	4-chloroaniline	UJ	L
UAA-9-90	4-chloroaniline	UJ	L
UAA-6-78	4-chloroaniline	Already qualified due to M	L
UAA-6-98	4-chloroaniline	UJ	L
UAA-6-98-D	4-chloroaniline	UJ	L
AA-0-5-22	4-chloroaniline	UJ	L
AA-0-5-42	4-chloroaniline	UJ	L
AA-0-5-42-D	4-chloroaniline	UJ	L
AA-05-62	4-chloroaniline	UJ	L
AA-0-5-82	4-chloroaniline	UJ	L

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal stan	idard area of every sample a	nd blank within upper and le	ower QC limits for each contin	nuing calibration?		х	
		Area > +100%	Area < -50%	Area < -10%	, <u> </u>		•	
	Positive	J	J	J				
	Non-detect	None	UJ	R				
Note:	calibration. Thu	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention tin	nes of internal standards with	nin 30 seconds of the associ	ated calibration standard?		X		
	Action: The chr reviewer may co	omatogram must be examinonsider partial or total rejecti	ed to determine if any false on of the data for non-detec	positives or negatives exist. F ts in that sample/fraction.	for shift of a large magnitude, the			

Note: Samples UAA-9-30 and UAA-9-30 RE internal standards were outside QC limits. Qualifications are listed below.

Field ID	Analytes	IS Recoveries Low/High	Internal Standards	Quals	Code
UAA-9-30	All SVOCs	IS Recoveries Low	ANT / CRY / PRY	R	I
UAA-9-30 RE	All SVOCs	IS Recovery Low	PRY	UJ	I

PHN = Phenanthrene-d10 CRY = Chrysene-d12 PRY = Perylene-d12 DCB = 1,4-Dichlorobenzene-d4 NPT = Naphthalene-d8 ANT = Acenaphthene-d10 The R qualifiers supersede the qualifiers assigned due to surrogates.

11.0 TCL Identification (Code W)

Ir		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
	calibration?			X
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample			
11.2	and standard relative ion intensities agree within 30%?			X

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			X
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			1

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits?	х		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			-

Note:

Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D.

Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		x		
14.2	Number of samples:	15	58000000000000000000000000000000000000	<u> </u>	
14.3	Number of target compounds in each analysis:	65		_	
14.4	Number of results rejected and not reported:	1	+		
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$			<u> </u>	 -
<u>L</u>	% Completeness	99,9	 	_	

HERBICIDES ANALYSIS

Reviewer:

Amelia Turnell

Project Name:

Sauget - Area 2

Date:

10/14/2005

Project Number:

Review Level:

21561510.60010

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS016 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

One analyte was rejected due to low MS/MSD recovery.

Field IDs:

UAA-8-106	UAA-9-90	AA-0-5-22
UAA-8-106-D	UAA-6-78	AA-0-5-42
UAA-9-30	AA-0-5-42-D	UAA-9-70
UAA-9-50	AA-05-62	UAA-6-98-D
UAA-9-50-D	ΠΑΔ-6-98	A A - O - 5, 82

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		·
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated that the MS/MSD PCP spike was recovered low. Although it is not part of this review, it should be noted that the CCV exceeded the %D criteria for 2,4-DB for 2 samples thus the grand mean exception rule was applied.

2.0 Holding Time/ Preservation (Code H)

			Yes	No	NA
	2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	-	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the			
<u></u>		cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
	2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached			
1	2.2	Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	İ
		Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
	2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note: All samples were extracted and analyzed within hold time.

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		х	
3.3	Do any field/rinse/equipment blanks have positive results?			x
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The blanks did not have any detections.

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			Х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $<$ 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			l
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					<u> </u>	Yes	No	NA
6.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form?					X		
6.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?		x					
6.3	3	If No in Secti	on 6.2, were these	e sample(s) or method blank(s)	reanalyzed?			х
6.4	ļ	If No in Secti	on 6.3, is any sam	ple dilution factor greater than	10? (Surrogate recoveries may be diluted or	ıt.)	-	х
			> UCL	10% to LCL	< 10%			
		Positive	J	J	J			<u> </u>
		Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same</i> site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample UAA-6-78 was used as the MS/MSD. Pentachlorophenol recoveries were outside QC limits. The qualifier is listed below.

Field ID	Analytes	MS/MSD/RPD Recoveries	MS/MSD/RPD Limits
UAA-6-78	Pentachlorophenol	5/5/NC	46-144 / 40

Field ID	Analyte	Qualification	Code
UAA-6-78	Pentachlorophenol	R	М

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	X	100 A	
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		<u> </u>
8.4	If Level IV, verify the % recoveries are calculated correctly.			1
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: LCS results were within criteria.

9.0 TCL Identification (Code W)

Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in	I NA
the continuing calibration?	X

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			X
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	X		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D.

Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP 90% for soil sample)	or use 95% for aqueous sample,	X		
12.2	Number of samples:	15			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	1		·	
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	99.3			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Amelia Turnell		Pro	ject N	Vame	:		Sauge	et - Ai	rea 2			
Date:	10/14/2005	-	Pro	ject N	Numb	er:		2156	1510.	6001	1		
Laboratory	Severn Trent Laboratory - Savannah	-		G No.				SAS	016				
		-	Rev	iew I	_evel:			Level	III				
Major Anoma	lies:												
	No samples were rejected												
Minor Anoma	lies:												
	Samples were qualified due to holding times and MS/MSD recoveries.												
Field IDs:				_									
ricia IDS:	UAA-8-106		UAA					A	4-0-5	-22			
	UAA-8-106-D		UAA	L-6-78	8			\mathbf{A}	4- 0-5	-42			
	UAA-9-30	A	\A-0-	5-42	-D			U	4A-9-	-70			
	UAA-9-50		AA-	05-62	2			UAA	A-6-9	8-D			
	UAA-9-50-D		UAA	-6-9	3			A	4-0-5	-82			
1.0 Chain of C	Custody/Sample Condition/Raw Data		ICP]	CP-N	1S		GFA.	A	C	VAA-	Hg
1		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	Х									X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x						74-			Х		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality										x		

Note:

1.4

1.5

The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits. Due to abundance, some analytes were reanalyzed at dilutions. In addition, one mercury sample was analyzed outside holding time.

Does sample preservation, collection and storage meet method requirement? (water samples:

Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete x

with Nitric Acid to pH < 2, and soil/sediment samples: 4 °C +2 °C)

documentation, contact the laboratory for explanation/resubmittal.

of the data?

2.0 Holding Time (Code H) ICP-MS GFAA CVAA-Hg ICP No NA Yes Yes No NA Yes No NA Yes No NA Have any technical holding times, determined from date of collection to date of analysis, been 2.1 X X exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table. Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria) J(+)/R(-).

Note: Mercury in sample UAA-6-78 was analyzed outside holding time. The qualifier is listed below.

Field ID	Analyte	Days late	Qualification	Code
UAA-6-78	Mercury	6	UJ	H ·

3.0 Instrume	nt Calibration (Code C)						ICP	-	I	CP-M	1S		GFA.	Ą	CV	AA-	Hg
		_				Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stan				lank + one standar	d;		x									
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: J	(+)/UJ(-).												x
3.3	Was an initial calibration of If no, use professional jud	verification (I	CV) analyzed at the rmine affect on the	he beginning of eache data and note in	ch analysis? Actio	n:		x									х
3.4	Was continuing calibratio whichever is more frequen data and note in reviewer	t? Action: If						х									x
3.5	Are all calibration standar Mercury (80%-120%) and			and CCV) within	the control limit	?		х									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)							20.00					
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%												

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		10	CP-N	1S	(3FA	4	C/	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	x									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										X	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									×		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										Х		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х					-					X	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		х									Х	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									х	

Note: Potassium was detected above the IDL in the preparation blank; however, the sample values were greater than 5 times the blank result. No qualification of data were required.

5.0 ICP In	terference Checl	k Sample (IC	S) (Code N)					ICP		I	CP-N	1S		GFA.	Ą	CV	/AA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1					at least twice ever uent) for ICP-MS	y 8 hours), and at the	ne		х									
5.2	Are the IC	S AB recoveri	es within 80% -	120%?					X									
5.3	Are the res	ults for unspil	ked analytes (in	ICS A) < + IDL	?				х				†					
5.4	If not, are ICS?	the associated	l sample Al, Ca	, Fe, and Mg co	oncentrations less	than the level in the	ne		х							-		
	Action:	Not Spik	ed Analytes	Spiked	i analytes (ICS Al	B analytes)	200				· · · ·							
		<-IDL	> IDL	< 50%	50% - 79%	> 120%												
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)							†					

.0 Laborate	aboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)							ICP		ICP-MS			GFAA			CVAA-Hg		
			<u> </u>				Yes	No	NA	Yes	No	NA	Yes	No	NA '	Yes :	No N	
6.1	Was an LC matrix and	S prepared and per level)? Ac	I analyzed at the	e correct freque) any sample r	ency (one per 20 not associated wit	samples, per batch, pe h LCS results.	r X									x		
6.2			ide the control PA-EMSL/LV)		ous limits: 80% -	120% - except Ag an	d	x			-						X	
	Action:	Sc	olid		Aqueous											Ì		
		< LCL	> UCL	< 50%	50% - 79%	> 120%												
_		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

Note:

7.0 Laborato	Laboratory Duplicates (Code K)				ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,									\Box			
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes								1.		x		
	not associated with Duplicate results.							14) XXX 8647		ı İ			
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional											AZ.	
7.2	judgment. Note in worksheet.	ļ	X							. !		X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < + PQL for												
7.3	aqueous, and RPD < 35% or difference < + 2 X PQL for solids) Action: If no, J(+).	X									X		
<u>L</u>	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.											T	

Note: Sample UAA-6-78 was analyzed in duplicate. All RPD's were within criteria.

Spike Sai	mple Analysis -P	re-Digestion (C	ode M - Recovery, Code l	D - RPD)		ICP			ICP-MS			GFAA			CVAA-H		Hg
						Yes	No	NA Y	l'es	No	NA	Yes	No	NA	Yes	No	NA
8.1	batch, per ma		l)? Action: If no, J(+), w	ect frequency (one per 20 s ith professional judgment,											X		
8.2	Was a field b Note in works		MS analysis? Action: It	f yes, J(+) with professiona	ıl judgment		Х									Х	
	Note: Matrix sample in an S		may be performed on a fic	eld blank when it is the or	nly aqueous							-					
8.3		nit of 75-125%;		ncentration, are spike recovers to analytes with concentration			х								ж		•
	%	%R > 125%	30% < %R < 74%	%R < 30%													•
	Positive	J	J	J													
	Non-detect	None	UJ	R													

Note: Sample UAA-6-78 was spiked and the aluminum recovery was high (310 and 323 percent and the range is 75-125). The RPD was within limits The qualifier is listed below.

Field ID	Analyte	Qualification	Code
UAA-6-78	Aluminum	J	M

9.0 Instrument Detection Limits (IDL)			ICP			ICP-MS			GFAA			CVAA-Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA	
9.1	Are all IDL equal to or less than the reporting limits specified?		x				Tiii					х		

Note:

10.0 ICP Seri	0.0 ICP Serial Dilutions (Code S)		ICP			CP-N	1S		GFA.	A	CV	Hg	
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x									х		
10.2	Was a five-fold dilution performed?	x									x		
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, $J(+)$.										х		

Note: Samples AA-0-5-22 and UAA-6-78 were diluted and analyzed. All %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F) ICP ICP-MS GFAA CVAA-Hg Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA 11.1 Were any field duplicates submitted for metal analysis? Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ±2 x PQL and for solids, RPD < 100% or difference < ±4 x PQL)

Note: Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D. Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

12.0 Result V	12.0 Result Verification (Code Q)		ICP ICP-MS			GFAA		A CVAA-		AĀ-I	Hg		
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes-	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									х
12.2	Were all dilution reflected in the positive results and detection limits?			х									x

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
13.2	Number of samples:	15	0	 0	 15
13.3	Number of target compounds in each analysis:	22	0	0	 1
13.4	Number of results rejected and not reported:	0	0	0	 0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	100	####	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Date:

Amelia Turnell

10/14/2005

Severn Trent Laboratory - Savannah

Laboratory **Test Name:**

Ammonia

Method No.:

350.1

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 016

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

One sample was qualified due to MS/MSD recovery.

Field IDs:

UAA-8-106

UAA-9-90

AA-0-5-22

UAA-8-106-D

UAA-6-78

AA-0-5-42

UAA-9-30

AA-0-5-42-D

UAA-9-70

UAA-9-50

AA-05-62

UAA-6-98-D

UAA-9-50-D

UAA-6-98

AA-0-5-82

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		."

Note:

The case narrative indicates that the MS/MSD recovery was outside QC limits.

2.0 Holding	Time/ Preservation (Code H)	Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
1	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, $J(+)/UJ(-)$.		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks)

(Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?	***************************************	X	
3.3	Do any field/rinse/equipment blanks have positive results?		Х	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			-

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			X
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			X
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.	· · · · · · · · · · · · · · · · · · ·		

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		X	-
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample UAA-6-78 was used as the MS/MSD and had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD recoveries	MS/MSD Limits
UAA-6-78	Ammonia	36/35	90-110

Field ID	Analyte	Qual	Code
UAA-6-78	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

8.0 Analyte Identification

r		Yes	No	NA
8 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT			
0.1	in the continuing calibration?			X

Note:

9.0 Analyte Quantitation and Reported Detection limits

·		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			X
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			v
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			v
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted for ammonia analysis?	χ.		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	Y		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample UAA-8-106 was analyzed as the duplicate for UAA-8-106-D and sample UAA-9-50 was analyzed as the duplicate for UAA-9-50-D.

Sample UAA-6-98 was analyzed as the duplicate for UAA-6-98-D and sample AA-0-5-42 was analyzed as the duplicate for AA-0-5-42-D.

11.0 Laboratory Duplicates (Code K)

<u> </u>		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and			
11.1	per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.		¥	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	X		

Note:

12.0 Data Completeness

		Yes	No	NA
Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
Number of samples:	14			L
Number of target compounds in each analysis:	1			
Number of results rejected and not reported:	0			
% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
% Completeness	100			
	sample) Number of samples: Number of target compounds in each analysis: Number of results rejected and not reported: % Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)	Number of samples: Number of target compounds in each analysis: Number of results rejected and not reported: % Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2) % Completeness	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample) Number of samples: Number of target compounds in each analysis: Number of results rejected and not reported: % Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample) Number of samples: Number of target compounds in each analysis: Number of results rejected and not reported: % Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2) % Completeness

			·
		·	

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:

Amelia Turnell

Project Name:

Sauget - Area 2

Date:

10/15/2005

Project Number:

Review Level:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 017 Level III

Major Anomalies:

There were no major anomalies in this SDG.

Minor Anomalies:

There were no qualifiers assigned.

Field IDs:

UAA-7-18

UAA-7-78

AA-Clay-2-42

UAA-7-38

UAA-7-98

AA-Clay-2-42-D

UAA-7-98-D

AA-Clay-2-62

UAA-7-58-D

Trip Blank

Trip Blank

Trip Blank

UAA-7-58

AA-Clay-2-22

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
 1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the MS/MSD recoveries for target compound 4-methyl-2-pentanone were low.

Four samples were analyzed at primary dilutions due to target analyte abundance.

2.0 Holding Time/ Preservation (Code H)

			<u></u>		Yes	No	NA
2.1	Do sample preservati	on, collection and stor	age condition meet m	ethod requirement?	X		
	If sample preservation temperature is outside temperature exceeds						
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).					X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).					X	

Note:

All samples were analyzed within holding times.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?		x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.		X
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.		X

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		x	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	<u> </u>	x	
· .	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			×

Note:

There were no detections in any of the blanks.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			Х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.		7.5	x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
 7.1	Are all sampl	es listed on the app	propriate Surrogate Recovery Su	ummary Form ?	x		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples?	x		
7.3	If No in Secti	on 7.2, were these	sample(s) or method blank(s) re	eanalyzed?			x
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)						х
	Note: If SMO reanalysis is r		t meet acceptance criteria in sam	nples chosen for the MS/MSD or diluted samples, the	nen no		
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

All surrogate recoveries were within QC limits.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		Х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample UAA-7-38 was the MS/MSD client designated sample. The MS/MSD recoveries were low for 4-methyl-2-pentanone (57% and 56%, the range is 62-130%). The RPD was within limits. Qualifications were not made based on MS/MSD alone and the LCS recoveries associated with this sample was within QC limits. No qualification of data were required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

All LCS recoveries were within criteria.

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal stan	dard areas for every sample	and blank within upper and	lower QC limits?		х		
		Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				
Note:	continuing calib	cification is for the continuin ration. Thus, if all other QC y choose not to flag individu	specifications are met for	d to the mid-point initial calibration a given sample, using informed pro	n, not sample to fessional judgment,			_ ,,
10.2	Are retention tim	nes of internal standards with	nin 30 seconds of the associ	ated calibration standard?		X		
	Action: The chr magnitude, the re	omatogram must be examine eviewer may consider partia	ed to determine if any false or total rejection of the date	positives or negatives exist. For shar a for non-detects in that sample/fra	ift of a large ction.			

Note:

11.0 TCL Identification (Code W)

 		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
	calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
11.2	do sample and standard relative ion intensities agree within 30%?			X

Note:

12.0 TCL/TIC Q	Quantitation and Reported Detection limits (Code K)	Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	х		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		· 	

Note:

Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42.

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use sample)	95% for aqueous sample, 90% for soil	X		
14.2	Number of samples:	14	300000000000000000000000000000000000000		<u> </u>
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Amelia Turnell

Date:

10/16/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Sauget - Area 2

Project Number:

21561510.60011

SDG No.:

SAS017 Level III

Review Level:

Major Anomalies:

None

Minor Anomalies:

A few samples were qualified estimated and estimated non-detect due to surrogate and internal standards recoveries outside QC limits.

Field IDs:

UAA-7-18

UAA-7-58-D

AA-Clay-2-22

UAA-7-38

UAA-7-78

AA-Clay-2-42

UAA-7-98

AA-Clay-2-42-D

UAA-7-58

UAA-7-98-D

AA-Clay-2-62

1.0 Chain of Custody/Sample Condition

1.2 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained? Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples.			Yes	No	NA
Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples.	1.1	Do Chain-of-Custody forms list all samples analyzed?	X	_	
Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
analytical problems of special circumstances affecting the quality of the data?	1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x	-	

Note:

The laboratory case narrative indicated surrogate recoveries, 4-chloroaniline MS/MSD recoveries and one sample internal standards recovered outside the control limits. Several samples were anlayzed at dilutions. Sample UAA-7-58 is flagged with an Estimated (E) value for 1,4-dichlorobenzene. Due to a laboratory error, this sample was not re-analyzed at a dilution.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		·
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (>			
	10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
	Table for sample holding time) If yes, J(+)/UJ(-).		Х	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

All samples were extracted and analyzed within holding times.

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			X
3.2	Have all samples been analyzed within twelve hours of the tune?			X
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			<u> </u>

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

			Yes	No	NA
I	4.1	Is a Method Blank Summary form present for each batch?	x	· · · · · · · · · · · · · · · · · · ·	
	4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		x	
	4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?			v
		Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
	4.4	If Level IV, review raw data and verify all detections for blanks were reported.		· · · · · · · · · · · · · · · · · · ·	

Note:

There were no detections in the blanks.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			Х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			-

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		· ·	x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on the appr	ropriate Surrogate Recovery	Summary Form ?	X		
7.2	Are surrogate recoveries within ac	cceptance criteria specified in	the QAPP for all samples and method blanks?		x	
7.3	Are more than one of either fraction	on outside the acceptance cri	teria?	x		-
7.4	If Yes in Section 7.3, are these sai	mple(s) or method blank(s) re	eanalyzed?		х	
7.5	If Yes in Section 7.3, is any samp	le dilution factor greater thar	10?	1	x	
	Note: If SMC recoveries display acids and base/ neutrals are assess	unacceptable recoveries in the	e MS and/ or diluted samples, then no reanalysis is required and			_
	> UCL	10% to LCL	< 10%	 		
	Positive J	J	J			
	Non-detect None	UJ	R			

Note:

Sample AA-Clay-2-22 DL surrogates were not recovered due to a dilution of 5. Qualifiers are listed below.

Field ID	Surrogate	Recoveries	Limit	
AA-Clay-2-42 DL	Phenol / 2-Fluorophenol /	105 / 122 / 105	55 104 / 56 100 / 60 100	
TITI-Clay-2-42 DE	Nitrobenzene	103 / 122 / 103	55-104 / 56-100 / 60 102	

Field ID	Analytes	Qualifiers	Code
AA-Clay-2-42 DL	All analytes	J (only for detections)	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		X	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample UAA-7-38 was the MS/MSD client designated sample. The MS/MSD recoveries were low for 4-chloroaniline (16% and 20%, the range is 22-107%). The RPD was within limits. Qualifications were not made based on MS/MSD alone and the LCS recoveries associated with this sample was within QC limits. No qualification of data were required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		·
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	X		· · · · · · · · · · · · · · · · · · ·
	Action for specific compound outside the acceptance criteria: $R>UCL$, $J(+)$ only; LCL , $J(+)/UJ(-)$; $<10\%$ $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)	1		
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: All LCSs recoveries were within control limits.

10.0 Internal Standards (Code I).

						Yes	No	N.A
10.1	Are internal stan	dard area of every sample ar	d blank within upper and lo	ower QC limits for each contin	uing calibration?		X	
		Area $> +100\%$	Area < -50%	Area < -10%				
	Positive	J .	J	J				
	Non-detect	None	UJ	R				
Note:	continuing calib	cification is for the continuin ration. Thus, if all other QC cose not to flag individual sa	specifications are met for a	d to the mid-point initial calibration distribution distribution of the mid-point informed distribution distr	ration, not sample to professional judgment, the			
10.2		nes of internal standards with		ated calibration standard?		X		
_	Action: The chromagnitude, the re	omatogram must be examine eviewer may consider partial	d to determine if any false p or total rejection of the data	positives or negatives exist. For non-detects in that sample	or shift of a large e/fraction.			

Note: Sample AA-Clay-2-42-D internal standards were outside of criteria. Qualifications are listed below.

Sample ID	Internal Standards Area	Internal Standards	Lower and Upper Limits
AA-Clay-2-42-D	25906 / 116925 / 58923 / 90922 /	DCB/NPI/ANI/PHN/CRY/PRY I	39475-157900 / 169311-677244 / 83208 - 332832 /
	90062 / 91237		125511 -502046 / 117157-468630 / 115821-463286

DCB=1,4-Dichlorobenzene NPT=Naphthalene ANT=Acenaphthene PHN=Phenanthrene CRY=Chrysene PRY=Perylene

Sample ID	Analytes	Qualification	Code
AA-Clay-2-42-D	All analytes	J/UJ	I

11.0 TCL Identification

<u></u>		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
11.1	calibration?			X
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do			
11.2	sample and standard relative ion intensities agree within 30%?			X

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits?		х	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			
	C. 1 HAA 7 60 D. 4 1 1 1 4 0 1 4 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			<u> </u>

Note:

Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42. In samles AA-Clay-2-42 and its duplicate AA-Clay-2-42-D, compounds 2-methylphenol, 3 & 4 methylphenol, 4-chloro-3-methylphenol, di-n-butyl phthalate, butyl benzyl phthalate, bis(2-ethylhexyl)phthalate and di-n-octyl phthalate had absolute differences greater than 2 times the reporting limits.

Sample ID	Analytes	Reason for Qualifier	Qualifiers Assigned	Code
AA-Clay-2-42	2-Methylphenol 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	2-Methylphenol 52 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	3 & 4 Methylphenol 110 ug/kg	difference >2xs the RL	J	F
AA-Clay-2-42-D	3 & 4 Methylphenol 3 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	4-Chloro-3-methylphenol 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	4-Chloro-3-methylphenol 96 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	Di-n-butyl phthalate 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	Di-n-butyl phthalate 57 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	Butyl benzyl phthalate 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	Butyl benzyl phthalate 1000 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	Bis(2-ethylhexyl)phthalate 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	Bis(2-ethylhexyl)phthalate 250 ug/kg	difference >2xs the RL	Already qualified due to I	F
AA-Clay-2-42	Di-n-octyl phthalate 9.6 U	difference >2xs the RL	UJ	F
AA-Clay-2-42-D	Di-n-octyl phthalate 88 ug/kg	difference >2xs the RL	Already qualified due to I	F

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use	95% for aqueous sample, 90% for soil sample)	X		
14.2	Number of samples:	11			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$		 		
	% Completeness	100	1	-	

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Date:

Amelia Turnell

10/16/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2 21561510.60010

SAS 0017

Level III

Major Anomalies:

There were no rejections.

Minor Anomalies:

One sample was qualified due to MS/MSD recovery.

Field IDs:

UAA-7-18

UAA-7-58-D

AA-Clay-2-22

UAA-7-38

UAA-7-78

AA-Clay-2-42

UAA-7-98

AA-Clay-2-42-D

UAA-7-58

UAA-7-98-D

AA-Clay-2-62

1.0 Chain of Custody/Sample Condition

 		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	Х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative indicated that the pentachlorophenol MS/MSD recovery was 0%. Sample AA-Clay-2-22 was analyzed at a dilution of 4 to bring PCP into the linear range.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (>			-
	10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
2.2	Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

All samples were analyzed within holding times.

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		Х	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.	·		
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

There were no detections in the blanks.

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	S2785-2-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	."		

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all samp	oles listed on the ap	propriate Surrogate Recovery	Summary Form ?	x		
6.2	Are surroga	te recoveries within	acceptance criteria specified i	n the QAPP for all samples?	x		
6.3	If No in Sec	tion 6.2, were these	e sample(s) or method blank(s)	reanalyzed?			x
6.4	If No in Sec	tion 6.3, is any sam	ple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)			x
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

All surrogate recoveries were within limits.

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	ж		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	х		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP? Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC		х	
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample UAA-7-38 was the client designated MS/MSD sample. Pentachlorophenol recovery was 0% in the MS/MSD (70-130%). The qualifier is listed below.

Field ID	Analyte	Qualification	Code
UAA-7-38	Pentachlorophenol	R	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code l - LCS recovery Code e - RPD)

	Yes	No	NA
Is an LCS recovery form present?	X	·	
Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
If Level IV, verify the % recoveries are calculated correctly.			
Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix? Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP? If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R>UCL,	Is an LCS recovery form present? Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix? Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP? If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R>UCL,	Is an LCS recovery form present? Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix? Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP? If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria: %R>UCL,

Note: All LCS and LCSD were recovered within limits.

9.0 TCL Identification (Code W)

He the relative retention time (DDT) of seek mount of the company	
9.1 Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			x
10.2	Are these limits adjusted to reflect dilutions and/or percent solids as required?		,	v v
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			T V
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			
-				1

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?	X		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use sample)	95% for aqueous sample, 90% for soil	x		
12.2	Number of samples:	11			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	1			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	99.1			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Amena Turnell	Project Name:	Sauget - Area 2	
Date:	10/16/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS017	
		Review Level:	Level III	
Major Anomo	olies:			
	No samples were rejected			
Minor Anomo	olies:			
	One sample was qualified due to high spike recovery.			
Field IDs:	UAA-7-18	UAA-7-58-D	AA-Clay-2-22	
	UAA-7-38	UAA-7-78	AA-Clay-2-42	
	UAA-7-98	AA-Clay-2-42-D	UAA-7-58	
	UAA-7-98 - D	AA-Clay-2-62		

1.0 Chain of Custody/Sample Condition/Raw Data

	•		ICP		IC	P-M	1S		GFA.	1	CV	'AA-I	Hg
		Yes	No	NA	Yes.	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x				П					X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х			•						X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?											X	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	x									X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	X									x		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time (Code H)

			ICP]	CP-N	/IS		GFAA	`	CV	VAA-I	Нg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									X	
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.												

Note:

All samples were analyzed within holding times.

3.0 Instrument Calibration (Code C)

							ICP		I	CP-N	AS .	(3FA	4	CV	AA-	Hg
···						Yes	No	NA	Yes	No	NA	Yes	No	NΑ	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand	cluded in the lards; CVAA	calibration curve : blank + five star	? (ICP/ICP-MS: b ndards)	lank + one standard			х									
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: J(+)/UJ(-).												х
3.3	Was an initial calibration value of the second seco	verification (l gment to dete	CV) analyzed at termine affect on the	the beginning of each	ch analysis? Action: reviewer narrative.			х									x
3.4	Was continuing calibration whichever is more frequent the data and note in review	nt? Action:	(CCV) performed If no, use profess	ed every 10 analys sional judgment to	is or every 2 hours, determine affect on			x									x
3.5	Are all calibration standa Mercury (80%-120%) and	ard percent other Metals	recoveries (ICV (90%-110%).	and CCV) within	the control limits?			х									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)												
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%												

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

				ICP		IC	CP-N	MS	(GFA.A	1	CV	/AA-I	-Ig
_			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	X									X		
	4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		X									Х	
	4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	X						4			X		
	4.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on	100.00000000000000000000000000000000000									x		
	4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		X									x	
	4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.			х						·			х
		Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, $J(+)/UJ(-)$.			х									х

Note: There were no detections in blanks.

5.0 ICP Interference Check Sample (ICS) (Code N)

								ICP es No NA			CP-N	MS		GFA.	1	CV	AA-l	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1					at least twice ever uent) for ICP-MS?	y 8 hours), and at the			х					·		'		
5.2	Are the IC	S AB recoveri	ies within 80% -	120%?					х				İ				l	
5.3	Are the res	sults for unspil	ked analytes (in)	ICS A) < + IDL?					х									
5.4	If not, are ICS?	the associated	d sample Al, Ca	, Fe, and Mg co	oncentrations less	than the level in the			x						•			
•	Action:	Not Spik	ed Analytes	Spiked	analytes (ICS AF	3 analytes)												
•		<-IDL	> IDL	< 50%	50% - 79%	> 120%												ļ i
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)											Ī	

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

			ICP		IC	P-MS		GFAA	C	VAA-H	ĺg
		Yes	No	NA	Yes	No NA	Yes	No N	A Yes	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	X							x		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)	l	х							X	
	Action: Solid Aqueous										ŀ
	<lcl> UCL < 50% 50% - 79% > 120%</lcl>	ł			i						l
	J(+)/UJ(-) $J(+)$ $R(+/-)$ $J(+)/UJ(-)$ $J(+)$										\neg

Note:

The LCS recoveries were within limits.

7.0 Laboratory Duplicates (Code K)

			ICP		IC	CP-N	1S	(GFA.	1	C١	/AA-	Hg
		Yes	No	NA	Yes	No	NA '	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	X									X		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X									X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids) Action: If no, J(+).		х									x	
·	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.						5						

Note:

Sample UAA-7-38 was analyzed in duplicate. All results were within control limits.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

		L	ICP		IC	CP-MS		FAA	CV	AA-H	g
		Yes	No	NA	Yes	No NA	Yes	No NA	Yes	No 1	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes no associated with matrix spike results.	x					-		X.		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment Note in worksheet.		X							Х	-
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.										
8.3	For all analytes with sample concentration $< 4 x$ spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration $> 4 x$ spike concentration.)		х	,						x	
	%R > 125% 30% < %R < 74% %R < 30%										
	Positive J J										
	Non-detect None UJ R										

Note: Aluminum was recovered high in the spike sample UAA-7-38. The qualifier is listed below.

Sample ID	Analytes	MS/MSD/RPD	MS/MSD/RPD Limits
UAA-7-38	Aluminum	216 / 181 / 6	75-125 / 20

Sample ID	Analytes	Qualification	Code
UAA-7-38	Aluminum	J	M

9.0 Instrument Detection Limits (IDL)

			ICP			ICP-M	S	(GFA.	4	CV	'AA-I	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			х									x

10.0 ICP Serial Dilutions (Code S)

			ICP		IC	CP-N	AS_		GFA/	A	C.	VAA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	x											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, $J(+)$.	x									•		

Note: Sample UAA-7-38 was analyzed at a dilution.

11.0 Field Duplicate Samples (Code F)

				ICP		IC	P-N	1S		3FAA	<u>. T</u>	CV	AA-	Hg
_			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
L	11.1	Were any field duplicates submitted for metal analysis?	x									x		
	11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$)	X									X		

Note:

Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42.

12.0 Result Verification (Code Q)

			ICP		I	CP-N	MS	(GFA.	4	C'	VAA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			X									x
12.2	Were all dilution reflected in the positive results and detection limits?			х									x

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
13.2	Number of samples:	11	0	0	11
13.3	Number of target compounds in each analysis:	22	22	0	1
13.4	Number of results rejected and not reported:	0	0	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100	100	100	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Amelia Turnell

Date:

10/16/2005

Laboratory

Severn Trent Laboratory - Savannah

Test Name:

Ammonia

Method No.:

350.1

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 017

Level III

Major Anomalies:

No analytes were rejected.

Minor Anomalies:

One sample was qualified based on MS/MSD recoveries.

Field IDs:

UAA-7-18

UAA-7-58-D

AA-Clay-2-22

UAA-7-38

UAA-7-78

AA-Clay-2-42

UAA-7-98

AA-Clay-2-42-D

UAA-7-98-D

AA-Clay-2-62

UAA-7-58

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		*-
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X	· · · · · ·	
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

2.0 Holding	Time/ Preservation (Code H)	Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	х		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 $^{\circ}$ C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note: All samples were analyzed within holding times.

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	Х		,
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?	-		
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.	 		<u> </u>

Note: The blanks did not have detections.

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			Х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?		-,-	×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			X
5.3	Do any analytes have a %R outside QC limits (80-120%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		X	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: The MS/MSD sample had recoveries below the QC limits. The qualifier is listed below.

Field ID	Analyte	Qualification	Code
UAA-7-38	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

			Yes	No	NA
	7.1	Is an LCS recovery form present?	¥		
	7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	·		
	7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
li	7.4	If Level IV, verify the % recoveries are calculated correctly.	A		
1		Action for specific compound outside the acceptance criteria: %R>UCL,		<u> </u>	
		J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			
				L	

Note: The LCS and LCSD recoveries were within limits.

8.0 Analyte Identification

		Yes	No	NA
0.1 DDm. 1 .	ention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard nuing calibration?	41		х

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			Y
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		4	V V
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			A
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			A
				ł

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted for ammonia analysis?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			
Motor	County TIAA 7 50 D : d 1 1 1 1	1		

Note:

Sample UAA-7-58-D is the duplicate of sample UAA-7-58. Sample UAA-7-98-D is the duplicate of sample UAA-7-98. Sample AA-Clay-2-42-D is the duplicate of sample AA-Clay-2-42.

11.0 Laboratory Duplicates (Code K)

<u> </u>		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		X	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.			- T
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			X

12.0 Data Completeness

			Yes	No.	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAl sample)	PP or use 95% for aqueous sample, 90% for soil	X		
12.2	Number of samples:	11			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100		-	

		·	

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Date:

8/30/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Sauget - Area 2 21561510.60011

Project Number:

SAS 018

SDG No.: Review Level:

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on surrogate, LCS recoveries and method blank contamination.

Field IDs:

AT-Q-34-SB-6

AT-Q-34-SS-0.5

AT-Q-33-S-0.5

AT-Q-32-SB-6

AT-Q-32-SS-2

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated that the LCS and surrogate recoveries were outside QC limits.

The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

 	-,				Yes	No	NA
2.1	Do sample preservat	tion, collection and sto	orage condition meet n	nethod requirement?	x		
	temperature is outsid	de the range 0° (but no	was inappropriate (i.e of frozen) to 10° flag a ections "J" and non-de	., <2° >6°C, etc.), comment in report. If unpreserved or all positive results with a "J" and all non-detects "UJ". If etects "R".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		1	X			
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days	 		
		Yes	14 days	14 days	 -		
	Soil/Sediment	4 °C +2 °C	14 days	14 days	 		
2.3	Have any technical l	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).				¥	

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			х
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			х
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.	200		х

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory flagged) concentrations.	'J"		
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: Several method blanks had contamination. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
AT-Q-34-SS-0.5	Chlorobenzene	U	=	Z
AT-Q-33-S-0.5DL	Methylene Chloride	U	-	Z
AT-Q-33-S-0.5DL	Chlorobenzene	U	-	Z
AT-Q-32-SB-6DL	Methylene Chloride	U	<u> </u>	Z

5.0 GC/MS Initial Calibration (Code C)

_			Yes	No	NA
L	5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
	5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
L		If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	5.00000000000	 	
	5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			x
L	5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			- Y
	5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			
					x

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?		227	х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samples	listed on the a	ppropriate Surrogate Recovery	Summary Form ?	x	-	
7.2	Are surrogate re	ecoveries withi	n acceptance criteria specified	in the QAPP for all samples?		x	
7.3	If No in Section	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?			x		
7.4	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x		 	
	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no reanalysis is required.				- <u></u>		
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J	7		
	Non-detect	None	UJ	R		_	

Note: Surrogate recoveries were outside QC limits for one sample. Qualifications are listed below.

Field ID Surrogate	Surrogate Recoveries	Surrogate Limits
AT-Q-32-SB-6 BFB, DBFM, TOL	133 / 140 / 139	68-121 / 66-127 / 65-128

BFB = 4-Bromofluorobenzene DBFM = Dibromofluoromethane TOL = Toluene-d8

Field ID	Analyte	Qualification	Code
AT-Q-32-SB-6	All detected VOCs	J	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrixRecoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		<u> </u>	
9.4	If Level IV, verify the % recoveries are calculated correctly.		*	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: Several LCS analytes had recoveries outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-13330	Acetone	22 / 25	28-143
LCS 680-13355	Acetone	20 / 22	28-143
LCS 680-13358	Chloromethane	31 / 73	42-140
LCS 680-13358	Acetone	18 / 28	28-143
LCS 680-13358	1,2-Dichloropropane	119 / 83	77-118
LCS 680-13358	Trichloroethene	106 / 75	80-122
LCS 680-13358	Ethylbenzene	110/81	82-118

Field ID	Analyte	Qualification	Code
AT-Q-34-SB-6	Acetone	J	L
AT-Q-33-S-0.5DL	Acetone	UJ	L
AT-Q-33-S-0.5	Acetone	J	L
AT-Q-32-SB-6DL	Chloromethane	UJ	L
AT-Q-32-SB-6DL	Acetone	UJ	L
AT-Q-32-SB-6DL	Trichloroethene	UJ	L
AT-Q-32-SB-6DL	Ethylbenzene	UJ	L

10.0 Internal Standards (Code I)

	 				Yes	No	NA
10.1	Are internal stan	idard areas for every sample	and blank within upper an	d lower QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%		<u> </u>	T .
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	continuing calib	cification is for the continuing ration. Thus, if all other QC y choose not to flag individu	specifications are met for	red to the mid-point initial calibration a given sample, using informed pro	on, not sample to ofessional judgment,		
10.2	Are retention tin	nes of internal standards wit	hin 30 seconds of the assoc	ciated calibration standard?	X		
· ·	Action: The chr magnitude, the r	omatogram must be examin eviewer may consider partia	ed to determine if any false Il or total rejection of the de	e positives or negatives exist. For sata for non-detects in that sample/fi	shift of a large raction.		

Note:

11.0 TCL Iden	tification (Code W)	Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and sample and standard relative ion intensities agree within 30%?	lo:		x

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			X
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	88888		x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			×

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		 -	

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use sample)	95% for aqueous sample, 90% for soil	x		
14.2	Number of samples:	5			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

iewer:

Bart Brandenburg

Project Name:
Project Number:

Sauget - Area 2

Level III

Date: Laboratory 8/30/2005 Severn Trent Laboratory - Savannah

SDG No.:

Review Level:

21561510.60011 SAS 018

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified due to surrogate, internal standard recoveries, and method blank contamination.

Field IDs:

AT-Q-34-SB-6

AT-Q-34-SS-0.5

AT-Q-33-S-0.5

AT-Q-32-SB-6

AT-Q-32-SS-2

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The MS/MSD and surrogates had recoveries outside QC limits. The method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (>	0	_	
	^O C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).	-	X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		•	

3.0 GC/MS Instrument Performance Check (Code T)

		Ф	Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?				х
3.2	Have all samples been analyzed within twelve hours of the tune?				x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".				
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?				X
	If no, all standards, blanks, field samples and QC samples are rejected "R".		8888387 - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: One method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
AT-Q-34-SS-0.5	Bis-(2-ethylhexyl) phthalate	U		Z

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			<u> </u>
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.		. 5.77	· ·
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.		<u> </u>	<u> </u>

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			X
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibratio RRF outside QC limits (%D < 20%)?	1		x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.	100000000000000000000000000000000000000		
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			X
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				Yes	No	NA
7.1	Are all samples listed on	the appropriate Surrogate Recover	y Summary Form ?	Х		
7.2	Are surrogate recoveries v	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?			x	
7.3	Are more than one of eith	er fraction outside the acceptance of	criteria?	x		
7.4	If Yes in Section 7.3, are t	these sample(s) or method blank(s)	reanalyzed?		x	
7.5	If Yes in Section 7.3, is ar	an 10?	x			
	Note: If SMC recoveries acids and base/ neutrals ar	display unacceptable recoveries in re assessed separately.	the MS and/ or diluted samples, then no reanalysis is required and			
	> UCL	10% to LCL	< 10%			
	Positive J	J	J		<u> </u>	
	Non-detect None	UJ	R	<u> </u>		

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
AT-Q-34-SB-6	2FP, NBZ, PHL	20 / 32 / 32	36-101 / 33-94 / 38-102
AT-Q-34-SS-0.5	2FP	29	36-101
AT-Q-33-S-0.5	2FP, PHL	22 / 33	36-101 / 38-102
AT-Q-34-SB-6	2FP	30	36-101

2FP = 2-Fluorophenol NBZ = Nitrobenzene-d5 PHL = Phenol-d5

Field ID	Analyte	Qualification	Code
AT-Q-34-SB-6	All Acid/fraction analytes	J/UJ	S
AT-Q-33-S-0.5	All Acid/fraction analytes	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

<u></u>		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	x		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Sample AT-Q-34-SB-6 was analyzed as the MS/MSD. Several analytes were outside QC limits for the MS/MSD sample, however the LCS was within QC limits; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	x		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	X		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

10.0 Internal Standards (Code I)

	· ·					Yes	No	NA
10.1	Are internal stan	idard area of every sample ar	d blank within upper and lo	ower QC limits for each conti	nuing calibration?		х	
		Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				
Note:	continuing calib	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.			oration, not sample to d professional judgment, the	e e		
10.2	Are retention tim	nes of internal standards with	in 30 seconds of the associa	ated calibration standard?		X		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.							

Note: Internal standard recoveries were below QC criteria for sample AT-Q-32-SB-6DL. Qualifications are listed below.

Field ID	Analyte	Internal standard Low/High	Qualification	Code
AT-Q-32-SB-6DL	All SVOCs	Low	J/UJ	I

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			х
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			. х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

_			Yes	No	NA
	12.1	Are RLs used consistent with those specified in the QAPP?			х
	12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
	12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			X
	12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
	12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		x	
13.2	Were all RPD or absolute difference values within the control limits?		•	X
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 9	95% for aqueous sample, 90% for soil sample)	X		
14.2	Number of samples:	5			
14.3	Number of target compounds in each analysis:	65		-	
14.4	Number of results rejected and not reported:	0			·
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer:

Bart Brandenburg

Date:

8/30/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:
Project Number:

Sauget - Area 2 21561511.60011

SAS 018

Review Level:

SDG No.:

Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

Field IDs:

AT-Q-33-S-0.5

AT-Q-32-SB-6

AT-Q-32-SS-2

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	<u> </u>		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x	<u> </u>	
1.2	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			 -
1.3	samples, analytical problems or special circumstances affecting the quality of the data?	х		

Note:

The laboratory case narrative indicated that the LCS, MS/MSD, and surrogate recoveries were outside QC limits

2.0 Holding Time/ Preservation (Code H)

	Yes	No	NA
Do sample preservation, collection and storage condition meet method requirement?	x		
If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding		X	
Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
		₩'	 _
	Do sample preservation, collection and storage condition meet method requirement? If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ". Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-). Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ". Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-). Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ". Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-). Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results (TCL)?		X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	-
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			Х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".		• •	

Note:

5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?	100		х
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

·				Yes	No	NA
7.1	Are all samples listed on the a	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?				
7.2						
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?					x
7.4	If No in Section 7.3, is any sar	mple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)		· · ·	x
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			

Note: One PCB surrogate was outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
AT-Q-33-S-0.5	Decachlorobiphenyl-13C12	24	30-130

Field ID	Analyte	Qualification	Code
AT-Q-33-S-0.5	All PCBs	J/UJ	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		Х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

The PCB MS/MSD sample AT-Q-33-S-0.5 had several analytes outside QC limits; however, all other QC parameters were within criteria. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	· NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
<u></u>	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			<u> </u>

Note:

The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS / LCSD Recoveries	LCS/LCSD Limits
LCS 680-11977	Endrin Ketone	44 / 53	47-156

Field ID	Analyte	Qualification	Code
AT-Q-33-S-0.5	Endrin Ketone	UJ	L
AT-Q-33-S-0.5DL	Endrin Ketone	UJ	L
AT-Q-32-SB-6	Endrin Ketone	UJ	L

10.0 TCL Identification (Code W)

		Yes	No	NA
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
10.1	continuing calibration?			X

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			х
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	>32/17/91/1/ 2 Name		x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations		AMM 60 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		Х	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.	100000000000000000000000000000000000000		

Note:

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or sample)	r use 95% for aqueous sample, 90% for soil	x		
13.2	Number of samples:	3			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
i	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

ъ	•			
Re	VIA	WA	r·	
***	* 10	***		

Bart Brandenburg

Date:

8/30/2005

Laboratory

Severn Trent Laboratory - Savannah

Project Name:

Project Number:

SDG No.:

Review Level:

21561510.60010 SAS 018 Level III

Sauget - Area 2

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS and MS/MSD recoveries.

Field IDs:

AT-Q-34-SB-6 AT-Q-32-SB-6

AT-Q-34-SS-0.5

AT-Q-32-SS-2

AT-Q-33-S-0.5

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of sample analytical problems or special circumstances affecting the quality of the data?	s, x		

Note:

The laboratory case narrative indicated that the MS/MSD and LCS had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	ж		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated	d		
· ·	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".	·		
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, $J(+)/UJ(-)$.		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).			
NT-4			A	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		x	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			•
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA.
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		·	
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			x
5.2	Has a continuing calibration standard been analyzed every 12 hours?	25/201	·	x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?		Salari Salari	x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag F			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

6.0 Surrogate Recovery (Code S)

·				Yes	No	NA
6.1	Are all samples listed on the	appropriate Surrogate Recovery Su	ımmary Form ?	X		
6.2	Are surrogate recoveries with	in acceptance criteria specified in	the QAPP for all samples?	X		
6.3	If No in Section 6.2, were the	ese sample(s) or method blank(s) re	eanalyzed?			x
6.4	If No in Section 6.3, is any sa	ample dilution factor greater than 1	0? (Surrogate recoveries may be diluted out	.)		X
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
. 7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample AT-Q-34-SS-0.5 was spiked and analyzed. Recoveries outside QC limits are listed in the following table.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-34-SS-0.5	Pentachlorophenol	56 / 62	71-109

Field ID Analyte	Qualification	Code
AT-Q-34-SS-0.5 Pentachlorophenol	J	M

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			1
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

Note: One LCS recovery was outside QC limits. Qualifications are listed below.

LCS ID	Analyte	LCS/LCSD Recoveries	LCS/LCSD Limits
LCS 680-12347	Pentachlorophenol	69 / 74	71-109

LCS ID	Analyte	Qualification	Code
AT-Q-34-SB-6	Pentachlorophenol	J	L
AT-Q-34-SS-0.5*	Pentachlorophenol	J	L
AT-Q-33-S-0.5	Pentachlorophenol	J	L
AT-Q-32-SB-6	Pentachlorophenol	J	L
AT-Q-32-SS-2	Pentachlorophenol	· UJ	L

9.0 TCL Identification (Code W)

		Yes	No	NA
9 1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
	calibration?			Х.

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			X
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".) y 300000000 (; ; , w) w ()		X
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		х	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			"

Note:

12.0 Data Completeness

 			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP sample)	or use 95% for aqueous sample, 90% for soil	X		
12.2	Number of samples:	5			
12.3	Number of target compounds in each analysis:	10		•	
12.4	Number of results rejected and not reported:	0			
·	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2	
Date:	8/30/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 018	··
		Review Level:	Level III	

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples are qualified based on holding times and MS/MSD recoveries.

Field IDs:

AT-Q-34-SB-6

AT-Q-34-SS-0.5

AT-Q-33-S-0.5

AT-Q-32-SB-6

AT-Q-32-SS-2

1.0 Chain of Custody/Sample Condition/Raw Data

			ICP		I	CP-M	1S		GFA.	4	CV	AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	X									X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х									x		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x									x		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C_{+}2^{\circ}C$)	X									х		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	X									x		

Note:

The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the method blank had detections above the MDL.

It was also noted that the holding times had been exceeded.

2.0 Holding Time (Code H)

			ICP		Ī	CP-M	ſS .		GFA.	4	C١	/AA-l	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x								х		
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.												

Note: One sampled was analyzed outside hold time for mercury. Qualifications are listed below.

Field ID	Analyte	Days late	Qualification	Code
AT-Q-34-SS-0.5	Mercury	1	J	Н

3.0 Instrument Calibration (Code C)

							ICP		IC	P-M	IS		GFA.	4	CV	'AA-	Hg
						Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand				nk + one standard;			x									
3.2	Are the correlation coeffic	ients > 0.995	? (for GFAA and	CVAA) Action: J((+)/UJ(-).							Andrews Andrews					X
3.3	Was an initial calibration Action: If no, use profess narrative.							х						,			x
3.4	Was continuing calibration whichever is more frequer the data and note in review	nt? Action: I						х									x
3.5	Are all calibration standa Mercury (80%-120%) and			nd CCV) within t	he control limits?			x									x
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)											T	
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%	- 61											

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		I	CP-M	1S	1	GFA.	4	C/	VAA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	Х									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	х										X	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	X									X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	300000000000000000000000000000000000000									X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										X	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x									X	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		х									x	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

								ICP		I	CP-M	1S	•	GFA.	4	CV	AA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1					t least twice every uent) for ICP-MS	8 hours), and at the?			x									
5.2	Are the IC	S AB recover	ies within 80% -	120%?					x									
5.3	Are the re	sults for unspi	ked analytes (in	ICS A) < + IDL	?				х									
5.4	If not, are ICS?	the associate	d sample Al, Ca	, Fe, and Mg co	ncentrations less t	han the level in the	9		х									
	Action:	Not Spil	ked Analytes	Spiked	d analytes (ICS AI	3 analytes)												
		<-IDL	> IDL	< 50%	50% - 79%	> 120%												
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

								ICP		I	CP-M	1S	(3FA	4	C١	AA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
6.1					ency (one per 20 s ot associated with	amples, per batch, per h LCS results.	X									X		
6.2			de the control A-EMSL/LV)		us limits: 80% -	120% - except Ag and		X							-		X	
	Action:	So	lid		Aqueous													
		< LCL	> UCL	< 50%	50% - 79%	> 120%												
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

			ICP		I	CP-M	1S	(GFA.A	1	C	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	2007/00/00/00/00/00									X		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		х					\$ 0.00 P.				X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	х									X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample AT-Q-34-SS-0.5 was analyzed in duplicate.

8.0 Spike Sample Analysis - Pre-Digestion (Code M - Recovery, Code D - RPD)

						ICF	-	I	CP-M	1S		GFA.	A	C	/AA-	Hg
		····			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	batch, per ma		analyzed at the correct fre Action: If no, J(+), with pros.											X		
8.2	Was a field banks		analysis? Action: If yes,	J(+) with professional judg	gment.	x									X	
	Note: Matrix sample in an		be performed on a field bla	ank when it is the only aq	lueous											
8.3		ntrol limit of 75-125%	centration < 4 x spike cor 6? (No control limit applies												х	
	_	%R > 125%	30% < %R < 74%	%R < 30%	46.44 46.44 46.44											
	Positive	J	J	J												
	Non-detect	None	UJ	R												

Note: Sample AT-Q-34-SS-0.5 was spiked and analyzed as the MS/MSD. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-Q-34-SS-0.5	Mercury	135 / 137	80-120

Field ID	Analyte	Qualification	Code
AT-Q-34-SS-0.5*	Mercury	J	M

9.0 Instrument Detection Limits (IDL)

			ICP		I	CP-N	1S	(GFA.	A	C١	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1	Are all IDL equal to or less than the reporting limits specified?			х									x

10.0 ICP Serial Dilutions (Code S)

			ICP		I	CP-M	1S		GFA.	A	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
10.1	Were serial dilutions performed?	х											
10.2	Was a five-fold dilution performed?	x						I^-					
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, $J(+)$.	x											

Note:

Samples AT-Q-34-SS-0.5 and AT-Q-32-SB-6 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

				ICP		I	CP-M	1S	(FA/	1	CV	/AA-	Hg
-			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1	11.1	Were any field duplicates submitted for metal analysis?		х									х	
	11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2$ x PQL and for solids, RPD $< 100\%$ or difference $< \pm 4$ x PQL)			х									X

Note:

12.0 Result Verification (Code Q)

			ICP		I	CP-N	1S	(3FA	4	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			х									x
12.2	Were all dilution reflected in the positive results and detection limits?			х									

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	Ī					
13.2	Number of samples:	5	 	0	-	0	 5
13.3	Number of target compounds in each analysis:	22		0		0	1
13.4	Number of results rejected and not reported:	0		0	 	0	 0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$	+					
	% Completeness	100		####	<u> </u>	####	 100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Date:

Bart Brandenburg

8/30/2005

Severn Trent Laboratory - Savannah

Laboratory Test Name:

Method No.:

Ammonia

350.1

Project Name:

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 018 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs:

AT-Q-34-SB-6

AT-Q-34-SS-0.5

AT-Q-33-S-0.5

AT-Q-32-SB-6

AT-Q-32-SS-2

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			-
1.5	samples, analytical problems or special circumstances affecting the quality of the data?		X	

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, $J(+)/UJ(-)$.		X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

·		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		Х	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			Х
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			Х
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".			-
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			Х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			-

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		x	
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

···		Yes	No	NA
7.1	Is an LCS recovery form present?	х		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

8.0 Analyte Identification

Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			Yes	No	NA
in the continuing calibration?	9 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT			
	6.1	in the continuing calibration?			Х

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			х
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			. X
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

<u></u>		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		Х	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			x
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			x

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPF sample)	or use 95% for aqueous sample, 90% for soil	X		
12.2	Number of samples:	5			
12.3	Number of target compounds in each analysis:	1	1		
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100	1		

DATA VALIDATION WORKSHEET **VOLATILE ORGANIC ANALYSIS**

Reviewer:

Date:

Bart Brandenburg

8/24/2005

Laboratory Severn Trent Laboratory - Savannah **Project Name:**

Project Number:

SDG No.:

Review Level:

Sauget - Area 2

21561510.60011

SAS 019 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

AA-CLAY-2-82	AA-CLAY-2-102
TB-17	UAA-10-22
UAA-10-62	UAA-10-82
TB-19	AT-P-4-WS-10-FB
SOIL-O-5-FB	TB-20
UAA-5-50	UAA-5-70
UAA-5-110	TB-21

AA-CLAY-2-119

UAA-10-42 UAA-10-102

AT-P-4-SS-0.5-FB

UAA-5-30

UAA-5-90

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	Х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The case narrative indicated that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

			,		Yes	No	NA
2.1		ion, collection and stor			x		
	temperature is outsid	on and/or temperature value the range 0° (but not 10°, flag positive dete	t frozen) to 10° flag al	<2°>6°C, etc.), comment in report. If unpreserved or Il positive results with a "J" and all non-detects "UJ". If ects "R".			
2.2	Have any technical h	olding times, determin	ned from sampling to o	late of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4 ^{\circ}\text{C} \pm 2 ^{\circ}\text{C}$	14 days	14 days			
2.3	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).				X		

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			x

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

[Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	x		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	4-25-	X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	X		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.		**************************************	
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

The field blanks and trip blanks had detections above the MDL. All associated samples were non-detect for the corresponding analytes; therefore, no qualification of data was required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			x
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

	Yes	No	NA
Are Continuing Calibration Summary forms present and complete?			X
Has a continuing calibration standard been analyzed every 12 hours?			X
Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $<$ 20%)?			х
If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			x
If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			
	Has a continuing calibration standard been analyzed every 12 hours? Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4. Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)? If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R. Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).	Are Continuing Calibration Summary forms present and complete? Has a continuing calibration standard been analyzed every 12 hours? Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4. Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)? If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R. Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).	Are Continuing Calibration Summary forms present and complete? Has a continuing calibration standard been analyzed every 12 hours? Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4. Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)? If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R. Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).

7.0 Surrogate Recovery (Code S)

·					Yes	No	NA
7.1	Are all sampl	es listed on the ap	propriate Surrogate Recovery S	ummary Form ?	X		
7.2	Are surrogate	recoveries within	acceptance criteria specified in	the QAPP for all samples?	X		
7.3	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?						x
7.4	If No in Secti	on 7.3, is any sam	ple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMO reanalysis is r		t meet acceptance criteria in san	nples chosen for the MS/MSD or diluted samples, then	no		
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			<u> </u>
	Non-detect	None	UJ	R			†

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		х	
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. The MS/MSD sample recovered bromoform above the QC limits. The parent sample; however, recorded bromoform at non-detect. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal stan	idard areas for every sample	and blank within upper and	lower QC limits?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			
Note:	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.				not sample to sional		
10.2	Are retention tin	nes of internal standards with	in 30 seconds of the associ	ated calibration standard?	x		
	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.				of a large on.	~~	

Note:

11.0 TCL Identification (Code W)			No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			x
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			Х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Dup	13.0 Field Duplicate Samples (Code F)		No	NA
13.1	Were any field duplicates submitted for VOC analysis?		Х	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		· -	

Note:

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for so sample)		x		
14.2	Number of samples:	10			
14.3	Number of target compounds in each analysis:	33		•	
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	100			

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Review Level:

Sauget - Area 2

Date:

8/24/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 019 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified due to LCS recoveries and blank contamination.

Field IDs:

AA-CLAY-2-82

AA-CLAY-2-102

AA-CLAY-2-119

UAA-10-22

UAA-10-42

UAA-10-62

UAA-10-82 AT-P-4-SS-0.5-FB UAA-10-102 SOIL-O-5-FB AT-P-4-WS-10-FB UAA-5-30

UAA-5-50

UAA-5-70

UAA-5-110

UAA-5-90

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		:

Note:

The field blanks and method blanks had detections above the MDL. The MS/MSD and LCS had recoveries outside QC limits.

The surrogate analytes had recoveries outside QC limits

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (2	-		
	10 °C), then flag all positive results with a "J" and all non-detects "UJ".			ľ
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		x	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

 		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

 		Yes	No	NA
 4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?	х		
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.	· -	300 FEBRUARY 0,	
4.4	If Level IV, review raw data and verify all detections for blanks were reported.		_	

Note:

The method blanks and field blanks had detections above the MDL. All associated analytes in the samples associated with the method blank were recorded non-detect, no qualification of data was required. Qualifications due to the field blank are listed below.

20	Field ID	Analyte	New RL	Qualification	Code
L	UAA-10-42	Bis(2-ethylhexyl) phthalate	-	U	X
L	UAA-10-62	Bis(2-ethylhexyl) phthalate		U	X

5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?	2.00000		x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.			х
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.	***************************************		
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.	-		x
6.6	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.	-		

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samp	les listed on the a	ppropriate Surrogate Recovery S	Summary Form ?	X		
7.2	Are surrogate	e recoveries within	acceptance criteria specified in	the QAPP for all samples and method blanks?		х	
7.3	Are more tha	n one of either fra	ction outside the acceptance crit	eria?	22.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2	X	
7.4	If Yes in Sec	tion 7.3, are these	sample(s) or method blank(s) re	analyzed?			x
7.5	If Yes in Sec	tion 7.3, is any sai	mple dilution factor greater than	10?			x
	Note: If SM0 acids and bas	C recoveries displese/ neutrals are ass	ay unacceptable recoveries in the essed separately.	e MS and/ or diluted samples, then no reanalysis is required an	d		
		> UCL	10% to LCL	< 10%	-		
	Positive	J	J	J			-
	Non-detect	None	UJ	R	1		
				T.			

Note: Only one surrogate recovered outside QC limits in three different samples; therefore, no qualification of data was required.

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. One analyte was outside QC limits for the MS/MSD sample, however the LCS was within QC limits for that analyte. No qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

			Yes	No	NA
9.	.1	Is an LCS recovery form present?	X		
9	.2	Is LCS analyzed at the required frequency for each matrix?	x		
9	.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		x	
		Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.	.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

Field ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-11797	4-Chloroaniline	10	22-107
LCS 680-12077	Hexachlorobutadiene	39	43-109

Field ID	Analyte	Qualification	Code
AA-CLAY-2-82	4-Chloroaniline	UJ	L
AA-CLAY-2-102	4-Chloroaniline	J	L
AA-CLAY-2-102DL	4-Chloroaniline	UJ	L
AA-CLAY-2-119	4-Chloroaniline	UJ	L
UAA-10-22	Hexachlorobutadiene	UJ	L
UAA-10-42	Hexachlorobutadiene	UJ	L
UAA-10-62	Hexachlorobutadiene	UJ	L
UAA-10-82	Hexachlorobutadiene	UJ	L
UAA-10-102	Hexachlorobutadiene	UJ	L
AT-P-4-WS-10-FB	Hexachlorobutadiene	UJ	L
AT-P-4-SS-0.5-FB	Hexachlorobutadiene	UJ	L
SOIL-O-5-FB	Hexachlorobutadiene	UJ	L

10.0 Internal Standards (Code I)

						Yes	No	NA
10.1	Are internal stan	dard area of every sample a	nd blank within upper and lo	ower QC limits for each contin	nuing calibration?		x	
		Area > +100%	Area < -50%	Area < -10%				
	Positive	J	J	J				
	Non-detect	None	UJ	R				
Note:	continuing calib	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may choose not to flag individual samples in this case.						
10.2	Are retention tim	nes of internal standards with	nin 30 seconds of the associ	ated calibration standard?		x		
				positives or negatives exist. Factorial representations in a for non-detects in that samp		#50.00000000000000000000000000000000000		

Note:

11.0 TCL Identification (Code W)

		Yes	No	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
11.1	calibration?			X
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do			
11.2	sample and standard relative ion intensities agree within 30%?			х

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

-		Yes	No	NA
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations	5.33		

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?		х	
13.2	Were all RPD or absolute difference values within the control limits?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

[max.				Yes	No	NA
1	14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 9	95% for aqueous sample, 90% for soil sample)	X	-	
1	14.2	Number of samples:	16			
	14.3	Number of target compounds in each analysis:	65			
1	14.4	Number of results rejected and not reported:	0			, ,
	•	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
		% Completeness	100		·	

· DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

8/25/2005

Project Number:

Review Level:

21561511.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 019 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs:

AT-P-4-WS-10-FB

AT-P-4-SS-0.5-FB

SOIL-O-5-FB

1.0 Chain of Custody/Sample Condition

P		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		-
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x	,	
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was		-	_
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".	-		
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	· · ·
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results (TCL)?		Х	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.	1		

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?		_	x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

·		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.		·	

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			х
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			· · · · ·
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

	· · · · · · · · · · · · · · · · · · ·			Yes	No	NA
7.1	Are all samples listed on the	appropriate Surrogate Recovery	Summary Form ?	Х		
7.2	Are surrogate recoveries with	nin acceptance criteria specified i	n the QAPP for all samples?	X		
7.3	If No in Section 7.2, were the	ese sample(s) or method blank(s)	reanalyzed?			x
7.4	If No in Section 7.3, is any sa	ample dilution factor greater than	10? (Surrogate recoveries may be diluted out.)	-,		x
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

····		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		Х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			х
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)	**************************************		

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" (+ only)			

Note:

10.0 TCL Identification (Code W)

		Yes	No	NA
	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
10.1	continuing calibration?			х

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			X
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			х
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	-7 4.10		х
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

12.0 Field Duplicate Samples (Code F)

		Yes	No	NA
12.1	Were any field duplicates submitted for analysis?		х	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
L	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

13.0 Data Completeness

			Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use	95% for aqueous sample, 90% for soil			
	sample)		^		
13.2	Number of samples:	3			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:

Laboratory

Date:

Bart Brandenburg

8/25/2005

Severn Trent Laboratory - Savannah

Project Name:

Sauget - Area 2 21561510.60010

Project Number:

SAS 019

Review Level:

SDG No.:

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AA-CLAY-2-82

AA-CLAY-2-102

AA-CLAY-2-119

UAA-10-22

UAA-10-42

UAA-10-62

UAA-10-82

UAA-10-102

AT-P-4-WS-10-FB

AT-P-4-SS-0.5-FB

SOIL-O-5-FB

UAA-5-30

UAA-5-50

UAA-5-70

'UAA-5-90

UAA-5-110

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

Note:

The laboratory case narrative indicated that the MS/MSD and LCS had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
2.2	Time Table for sample holding time) If yes, J(+)/UJ(-).		X	ı
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		x	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	. NA
3.1	Is a Method Blank Summary form present for each batch?	x		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.	1		

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument?			х
L	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			Х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.	-		

Note:

6.0 Surrogate Recovery (Code S)

				Yes	No	NA
6.1	Are all samples listed on the ap	Are all samples listed on the appropriate Surrogate Recovery Summary Form?		X		
6.2	Are surrogate recoveries within	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?				
6.3	If No in Section 6.2, were these	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?				
6.4	If No in Section 6.3, is any sam	ple dilution factor greater than	10? (Surrogate recoveries may be diluted out.)			x
	> UCL	10% to LCL	< 10%			
	Positive J	J	J			
	Non-detect None	UJ	R			· · · · · · · · · · · · · · · · · · ·

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. The MS/MSD had recoveries outside QC limits for pentachlorophenol; however all other QC was within criteria. No qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	Х		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x	-	
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

9.0 TCL Identification (Code W)

 		Yes	No	NA
0.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the		-	
 7.1	continuing calibration?			x

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes No	NA
10.1	Are RLs used consistent with those specified in the QAPP?		х
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.1	Were any field duplicates submitted for herbicide analysis?		х	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		х	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)				
12.2	Number of samples:	16			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100		•	

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2	
Date:	8/25/2005	Project Number:	21561510.60011	
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 019	• •
		Review Level:	Level III	
Major Anom	alies:			
	No samples were rejected			

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries.

Field IDs:	AA-CLAY-2-82	AA-CLAY-2-102	AA-CLAY-2-119
	UAA-10-22	UAA-10-42	UAA-10-62
	UAA-10-82	UAA-10-102	AT-P-WS-10-FB
	AT-P-4-SS-0.5-FB	SOIL-O-5-FB	UAA-5-30
	UAA-5-50	UAA-5-70	UAA-5-90
	UAA-5-110		

1.0 Chain of Custody/Sample Condition/Raw Data

		ICP		ICP-		ICP-MS		GFAA		CVAA-H		Hg	
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	x									X		-
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x									х		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?											x	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	X							3300		X	Secretary Sec.	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the laboratory for explanation/resubmittal.	X									X		

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time (Code H)

			ICP		I	CP-M	IS_		GFA.	4	CV	AA-I	Hg
<u> </u>		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		x									Х	
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.												

Note:

3.0 Instrument Calibration (Code C)

							ICP		I	CP-M	1S		GFA.	A	CV	'AA-	Hg
			···			Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
3.1	Are sufficient standards in GFAA: blank + three stand	cluded in the lards; CVAA	calibration curve : blank + five stan	? (ICP/ICP-MS: b	lank + one standard	;		x				//					
3.2	Are the correlation coeffici	ients > 0.995	? (for GFAA and	CVAA) Action: J(+)/UJ(-).												x
3.3	Was an initial calibration value of the land of the la	verification (I	ICV) analyzed at termine affect on the	he beginning of ea e data and note in	ch analysis? Action reviewer narrative.			x									x
3.4	Was continuing calibration whichever is more frequen data and note in reviewer n	t? Action: I	n (CCV) performe f no, use professio	ed every 10 analystal anal	sis or every 2 hours termine affect on the	,		х									x
3.5	Are all calibration standa Mercury (80%-120%) and	ard percent other Metals	recoveries (ICV (90%-110%).	and CCV) within	the control limits	?		х									х
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)	100 - 100 200 - 110 200 - 110									33.0		
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%												
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%					-							

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		I	CP-M	IS	(3FA	4	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	X									X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										ж	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	x									X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.										X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x										x	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		x				:					Х	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		x									X	

Note: Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required.

5.0 ICP Interference Check Sample (ICS) (Code N)

								ICP		I	CP-M	1S	<u> </u>	GFA	A	C	VAA-	Hg
							Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
5.1					at least twice ever uent) for ICP-MS?	y 8 hours), and at th	e		Х									
5.2	Are the IC	CS AB recover	ies within 80% -	120%?					х					1				
5.3	Are the re	sults for unspi	ked analytes (in I	(CS A) < + IDL?					х					 		-	İ	
5.4	If not, are ICS?	the associate	d sample Al, Ca	, Fe, and Mg co	oncentrations less	than the level in th	е		х									
	Action:	Not Spik	ted Analytes	Spiked	analytes (ICS AB	analytes)				2								
		<-IDL	> IDL	< 50%	50% - 79%	> 120%	- 100											
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

							<u> </u>	ICP		IC	P-M	IS	(GFA.	4	C	VAA-	Hg
							Yes	No	NA Y	es	No	NA	Yes	No	NA	Yes	No	NA
6.1					ency (one per 20 ot associated with	samples, per batch, per LCS results.	x									X		
6.2		recovery outs mits: as per EF			ous limits: 80% -	120% - except Ag and		X									x	
	Action:	Sc	olid		Aqueous													
		< LCL	> UCL	< 50%	50% - 79%	> 120%												
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)												

Note:

7.0 Laboratory Duplicates (Code K)

			ICP		I	CP-M	ſS	(GFA.	4	CV	/AA-l	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,										MZ (S)		
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	X					!				X		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.	Name of the last o	x								***************************************	Х	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids) Action: If no, J(+).	x									X		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.												

Note: Sample UAA-5-50 was analyzed in duplicate, with all RPD values within QC limits.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

						ICP		IC	CP-M	IS	(GFA.	4	CV	AA-	Hg
					Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
8.1	batch, per mati		Action: If no, J(+), with pr	equency (one per 20 samples, rofessional judgment, analytes										X		
8.2	Was a field bla Note in worksh		analysis? Action: If yes,	, J(+) with professional judgm	ent.	x									X	
	Note: Matrix sample in an Sl		be performed on a field b	lank when it is the only aque	ous											
8.3		it of 75-125%? (N		ration, are spike recoveries wi analytes with concentration >		x								X		
		%R > 125%	30% < %R < 74%	%R < 30%				V V 4.5				-				
	Positive	J	J	J	1											
	Non-detect	None	UJ	R												

Note: Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. The MS/MSD sample had several analytes outside QC limits. Qualifications are listed below.

Field ID	Analyte	MS/MSD Recovery	MS/MSD Limit
UAA-5-50	Barium	106 / 143 / 18	75-125 / 20
UAA-5-50	Chromium	123 / 172 / 13	75-125 / 20
UAA-5-50	Potassium	119 / 166 / 9	75-125 / 20
UAA-5-50	Zinc	126 / 155 / 7	75-125 / 20

Field ID	Analyte	Qualification	Code
UAA-5-50	Barium	J	M
UAA-5-50	Chromium	J	M
UAA-5-50	Potassium	J	M
UAA-5-50	Zinc	J	M

9.0 Instrument Detection Limits (IDL)

		ICP		I	CP-M	IS		GFA.	4	CV	'AA-l	Hg
Y	es es	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
9.1 Are all IDL equal to or less than the reporting limits specified?		Ì	х									х

Note:

10.0 ICP Serial Dilutions (Code S)

			ICP		I	CP-M	IS		GFA.	4	CV	/AA-	Hg
		Yes	No	NA	Yes	No	NA	Yes	No	ΝA	Yes	No	NA
10.1	Were serial dilutions performed?	X											
10.2	Was a five-fold dilution performed?	x											
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the original sample? If no, $J(+)$.	X											

Note: Sample AA-P-8-42 was diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

			ICP		IO	CP-M	1S	(GFA.	4	CV	AA-I	Hg
[Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?		х									х	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$)			х									х

12.0 Result Verification (Code Q)

		<u></u>	ICP		ICP ICP-MS		ICP-MS GFAA		١	CVAA-Hg			
		Yes	No	NA	Yes	No	NA	Yes	No	NA	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?	11.00		х									x
12.2	Were all dilution reflected in the positive results and detection limits?	900		х	2.2								х

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)						
13.2	Number of samples:	16		0		0	16
13.3	Number of target compounds in each analysis:	22		0		0	1
13.4	Number of results rejected and not reported:	0		0	- (5	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$	1				\top	
	% Completeness	100	#	4###	##	##	 100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:

Bart Brandenburg

Project Name:

Sauget - Area 2

Date:

8/25/2005

Project Number:

21561510.60011

Laboratory

Severn Trent Laboratory - Savannah

SDG No.:

SAS 019

Test Name:

Ammonia

Review Level:

Level III

Method No.:

350.1

Major Anomalies:

No samples were rejected

UAA-5-110

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries

Field IDs:

AA-CLAY-2-82 AA-CLAY-2-102
UAA-10-22 UAA-10-42
UAA-10-82 UAA-10-102
AT-P-4-SS-0.5-FB SOIL-O-5-FB
UAA-5-50 UAA-5-70

AA-CLAY-2-119 UAA-10-62

AT-P-WS-10-FB

UAA-5-30

UAA-5-90

1.0 Chain of Custody/Sample Condition

-	<u> </u>		Yes	No	NA
	1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
	1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			
<u></u>		samples, analytical problems or special circumstances affecting the quality of the data?	x		

Note:

The laboratory case narrative suggested that the MS/MSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		X	7
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

			Yes	No	NA
L.	3.1	Is a Method Blank Summary form present for each batch?	Х		
	3.2	Do any method blanks have positive results?	577	X	
	3.3	Do any field/rinse/equipment blanks have positive results?		X	
		Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
	3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			x
	If not, J(+)/UJ(-). In extreme cases, the reviewer may flag non-detects "R".		Now	
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			<u> </u>

5.0 Continuing Calibration (Code R)

 		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			Х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			х
5.3	Do any analytes have a %R outside QC limits (80-120%)?	-		x
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X	_	
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			-

Note:

Samples UAA-10-42 and UAA-5-50 were used as the MS/MSD samples. The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Filed ID	Analyte	MS/MSD Recovery	MS/MSD Limits
UAA-10-42	Ammonia	44 / 43 / 1	90-110 / 30
UAA-5-50	Ammonia	26 / 27 / 1	90-110 / 30

Filed ID	Analyte	Qualification	Code
UAA-10-42	Ammonia	J	М
UAA-5-50	Ammonia	J	M

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	5	No	NA
7.1	Is an LCS recovery form present?	X			
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x			
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X			
7.4	If Level IV, verify the % recoveries are calculated correctly.	S PARTIE AND S	2.1.4/8		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td><td></td></lcl,>				

Note:

8.0 Analyte Identification

		Yes	No	NA
8 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard			-
8.1	RRT in the continuing calibration?			х

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			X
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

F		Yes	No	NA
10.1	Were any field duplicates submitted?		x	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			<u> </u>

11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix			
	and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X.		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		Х	
	Are all analyte duplicate results within control? (RPD values < 20% or difference < ± PQL for aqueous, and RPD <		1.50,000	
11.3	35% or difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and	x		
	duplicate results are > 5 X IDL.			

Note: Samples AA-CLAY-2-102, UAA-10-42, and UAA-5-50 were used as laboratory duplicate samples.

12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)		X		
12.2	Number of samples:	16			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	100			

	•		

DATA VALIDATION REPORT

SUPPLEMENTAL INVESTIGATION – PHASE I

Sauget Area 2

Volume 1 – Text, Tables & Appendix B (SAS001 – SAS019)

Prepared for

Sauget Area 2 Sites Group c/o Steve Smith Solutia Inc. 575 Maryville Centre Drive St. Louis, MO 6314

Mr. Gary Uphoff American Zinc 5934 Nicklaus Drive Fort Collins, Colorado 80528



URS Corporation 1001 Highland Plaza Drive West, Suite 300 St. Louis, MO 63110 (314) 429-0100 **Project #21561510**

SAS020 through SAS004 Level IV



2.0 Holding Time/ Preservation (Code H)

					1 53	9	V
2.1	Do sample preservat	Do sample preservation, collection and storage condition meet method requirement?	ge condition meet meth	od requirement?	X		:
	If sample preservatio	on and/or temperature wa	as inappropriate (i.e., <	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or			
	temperature is outsid	le the range 0° (but not f	rozen) to 10° flag all p	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds	temperature exceeds 10°, flag positive detections "J" and non-detects "R".	ions "J" and non-detect	s "R".		-	
2.2	Have any technical h	Have any technical holding times, determined	d from sampling to date	from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical h	olding times been gross	ly (twice the holding tin	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	N _o	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			×
		19 200 COM MAY 200 CO. CO. CO.		
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			X
				•
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no. flag R.			,
				₹

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	×		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		×	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
	butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
	"J" flagged) concentrations.	-		
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

The method blank had detections above the MDL; however, all corresponding samples were non-detect for the analytes that had detections. No qualification of data were required.

5.0 GC/MS Initial Calibration (Code C)

		Yes	_ 0 V	₹ Z
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

6.0 Continuing Calibration (Code C)

		Yes	No No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			*
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits $(\%D < 20\%)$?			×
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

7.0 Surrogate Recovery (Code S)

					res	9	NA
7.1	Are all sample	s listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	orm?	X		
7.2	Are surrogate	recoveries within acceptanc	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	of for all samples?		×	
7.3	If No in Sectio	in 7.2, were these sample(s)	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	ż	×		
7.4	If No in Sectio	n 7.3, is any sample dilutio	on factor greater than 10? (Surre	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)	×		
	Note: If SMC	recoveries do not meet acc	eptance criteria in samples chos	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	quired.					
		> UCL	10% to LCL	<10%			
	Positive	J	ſ	ſ			
	Non-detect	None	UJ	Я			

Note: One sample had surrogate recoveries outside QC limits. Qualifications are listed below.

Surrogate Limits	68-121 / 66-127 / 65-128
Surrogate Recoveries	0/0/0
Surrogate	BFB, DBFM, TOL
Field ID	SOIL-O-5-SB-5.5

BFB=4-Bromofluorobenzene DBFM=Dibromofluoromethane TOL=Toluene-d8

Code	S
Qualifications	J/R
Analytes	All VOCs
Field ID	SOIL-0-5-SB-5.5

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		S		IVA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	×		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries < 10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

Field ID	Analytes	MS/MSD Recoveries	MS/MSD Limits
AT-P-2-WS-10	Acetone	12 / 15	28-143
AT-P-2-WS-10	2-Butanone	28 / 30	30-149

Code	M	M
Qualification	ſ	UJ
Analytes	Acetone	2-Butanone
Field ID	AT-P-2-WS-10	AT-P-2-WS-10

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	2	₹ Z
9.1	Is an LCS recovery form present?	×		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		*	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<10%$ $J(+)/R(-)$. RPD failures should be flagged "J" $(+)$ only)			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

rcs m	Analytes	LCS Recoveries	LCS Limits
LCS 680-12927	Chloromethane	31	42-140
LCS 680-12927	Acetone	18	28-143
LCS 680-12927	2-Butanone	28	30-149
LCS 680-14101	Chloroethane	211	20-140

AT-P-4-SB-4 Chloromethane UJ L AT-P-4-SB-4 Acetone J L AT-P-4-SB-4 2-Butanone UJ L AT-P-4-SB-4DL Chloromethane UJ L AT-P-4-SB-4DL 2-Butanone UJ L AT-P-4-SB-4-D Chloromethane UJ L AT-P-4-SB-4-D Chloromethane UJ L AT-P-4-SB-4-D Chloromethane UJ L AT-P-4-SB-4-DU Acetone UJ L AT-P-4-SB-4-DDL Acetone UJ L AT-P-4-SB-4-DDL AT-P-4-SB-4-DDL UJ L	Field ID	Analytes	Qualification	Poge
	AT-P-4-SB-4	Chloromethane	UJ	Л
	AT-P-4-SB-4	Acetone	ſ	Ţ
	AT-P-4-SB-4	2-Butanone	UJ	T
	AT-P-4-SB-4DL	Chloromethane	UJ	Ţ
	AT-P-4-SB-4DL	Acetone	UJ	Ţ
	AT-P-4-SB-4DL	2-Butanone	UJ	J
	AT-P-4-SB-4-D	Chloromethane	UJ	Ţ
	AT-P-4-SB-4-D	Acetone	ſ	T
	AT-P-4-SB-4-D	2-Butanone	M	I
	AT-P-4-SB-4-DDL	Chloromethane	UJ	Ţ
	AT-P-4-SB-4-DDL	Acetone	UJ	Ţ
	AT-P-4-SB-4-DDL	2-Butanone	UJ	1

10.0 Internal Standards (Code I)

					r es	0	A N
10.1	Are internal stand	Are internal standard areas for every sample and blank within upper and lower QC limits?	lank within upper and lower	QC limits?		×	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	ſ	ſ				
	Non-detect	None	UJ	ж			
	The method speci	The method specification is for the continuing cali	bration to be compared to the	ng calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibra	continuing calibration. Thus, if all other QC speci	fications are met for a given	specifications are met for a given sample, using informed professional			
	judgment, the revi	judgment, the reviewer may choose not to flag individual samples in this case.	ividual samples in this case.		•	•	
10.2	Are retention time	Are retention times of internal standards within 30 seconds of the associated calibration standard?	seconds of the associated ca	ulibration standard?	X		
	Action: The chron	matogram must be examined to c	letermine if any false positiv	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the rev	viewer may consider partial or to	tal rejection of the data for n	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.		-	
Note:	One sample had in	One sample had internal standard recoveries out of QC limits.	f QC limits.				

Code	I
Qualification	J/UJ
IS Recoveries High/Low	Low
Analytes	All VOCs
Field ID	SOIL-O-6-SB-5

11.0 TCL Identification (Code W)

		153	INU	IND
. 111	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
11.1	calibration?			×
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
7:11	do sample and standard relative ion intensities agree within 30%?			×

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		1 63	100	ZV.
12.1	Are RLs used consistent with those specified in the QAPP?			×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If ves. than flag "J".			
12.5	If Level IV calculate a samule of positive results to verify correct calculations			٠
City				

13.0 Field Duplicate Samples (Code F)

		res	res No NA	₹
13.1	Were any field duplicates submitted for VOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			
Note:	Samples AT-P-4-SB-4-D, SOIL-O-4-SS-0.5-D, and AT-P-4-SS-0.5-D were submitted as duplicates to samples AT-P-4-SB-4. SOIL-O-4-SS-0.5 and AT-P-4-SS-0.5-D.	SOIL-0-4-SS	5-0 5 and A	T-P-4-SS-
	0.5 respectively	; ; ;	(2)	-

14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	aqueous sample, 90% for soil	×		
14.2	Number of samples:	16			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	100			

SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION WORKSHEET

21561510.60011 Sauget - Area 2 SAS 020 Level III Project Number: Project Name: Review Level: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 9/2/2005 Laboratory Reviewer: Date:

Major Anomalies:

Samples were rejected based on holding times.

Minor Anomalies:

Field IDs:

Samples were qualified based on surrogate recoveries.

SOIL-0-6-SS-0.5 SOIL-0-5-SB-5.5 SOIL-0-4-SB-5.5 SOIL-O-7-SS-1.0 AT-P-4-SS-0.5 SOIL-0-4-SS-0.5-D SOIL-0-5-SS-0.5 AT-P-2-SS-0.5-D AT-P-4-SB-4-D AT-P-2-SB-6 SOIL-0-4-SS-0.5 SOIL-0-7-SB-6.0 SOIL-0-6-SB-5 AT-P-2-WS-10 AT-P-2-SS-0.5 AT-P-4-SB-4

1.0 Chain of Custody/Sample Condition

		-	011	V.
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
13	analytical problems or special circumstances affecting the quality of the data?	×		

Samples were reanalyzed outside of holding time. Note:

The MS/MSD and surrogates had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	°Z	¥ Z
2.1	Do sample preservation, collection and storage condition meet method requirement?	¥		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10			
	^o C), then flag all positive results with a "J" and all non-detects "UJ".			
<i>(()</i>	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table			
7:7	for sample holding time) If yes, J(+)/UJ(-).	×		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	x		
Note:	Samples were re-extracted outside of holding time. Qualifications are listed below.			

Samples were re-extracted outside of holding time. Qualifications are listed below.

Field ID	Analyte	Qualification	Days late	Code
AT-P-2-WS-10RE	All SVOCs	R	43	Н
AT-P-2-SB-6RE	All SVOCs	R	43	Н
AT-P-2-SS-0.5RE	All SVOCs	R	43	Н
SOIL-O-7-SS-1.0RE	All SVOCs	R	39	Н

3.0 GC/MS Instrument Performance Check (Code T)

		S I	2	V
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			×
3.2	Have all samples been analyzed within twelve hours of the tune?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".	200		

4.0 Blanks (Method

		Y es	NO NA	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		×	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		×	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the			:
	detection limit elevated to the RL for estimate concentrations.		-	•
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		Yes	%	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

		res	0	₩ Z
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			×
·	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	2°	NA
7.1	Are all samp	es listed on the appropriat	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	Form?	X		
7.2	Are surrogate	Are surrogate recoveries within acceptance criter	nce criteria specified in the QAI	ria specified in the QAPP for all samples and method blanks?		*	
7.3	Are more than	one of either fraction out	Are more than one of either fraction outside the acceptance criteria?	•	×		
7.4	If Yes in Sect	If Yes in Section 7.3, are these sample(s) or meth	s) or method blank(s) reanalyzed?	19	!	X	
7.5	If Yes in Sect	ion 7.3, is any sample dilu	If Yes in Section 7.3, is any sample dilution factor greater than 10?				*
	Note: If SMC	recoveries display unacce	eptable recoveries in the MS an	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and			*
	acids and base	acids and base/ neutrals are assessed separately,	parately,				
		> ncr	10% to LCL	<10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	UJ	R			

Note: Several surrogate recoveries were outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SOIL-O-6-SB-5	2FP, FBP, NBZ, PHL, TPH	13 / 23 / 17 / 16 / 27	36-101 / 38-104 / 33-94 / 38-102 / 40-129
AT-P-2-WS-10	2FP, FBP, NBZ, PHL, TPH	27/37/26/29/38	36-101 / 38-104 / 33-94 / 38-102 / 40-129
AT-P-2-WS-10RE	2FP, FBP, NBZ, PHL, TBP, TPH	0/0/0/0/0/0	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
AT-P-2-SB-6	2FP, FBP, NBZ, PHL, TBP, TPH	3/7/4/4/8	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
AT-P-2-SS-0.5	2FP, FBP, NBZ, PHL, TBP, TPH	11/25/17/16/19/32	36-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
AT-P-2-SS-0.5RE	2FP, FBP, NBZ, PHL	26 / 36 / 26 / 33	36-101 / 38-104 / 33-94 / 38-102
SOIL-O-7-SS-1.0	FBP, NBZ, TBP, TPH	117 / 102 / 153 / 157	38-104 / 33-94 / 27-124 / 40-129
SOIL-O-7-SS-1.0RE	2FP, FBP, NBZ, PHL, TPH	15/18/16/17/39	36-101 / 38-104 / 33-94 / 38-102 / 40-129

2FP=2-Fluorophenol FBP=2-Fluorobiphenyl NBZ=Nitrobenzene-d5 PHL=Phenol-d5 TBP=2,3,6-Tribromophenol TPH=Ter[henyl-d14

Field ID	Analyte	Qualification	Code
SOIL-O-6-SB-5	All SVOCs	tU/t	S
AT-P-2-WS-10	All SVOCs	J/UJ	S
AT-P-2-WS-10RE	All SVOCs	J/R	S
AT-P-2-SB-6	All SVOCs	J/UJ	S
AT-P-2-SS-0.5	All SVOCs	J/UJ	S
AT-P-2-SS-0.5RE	All SVOCs	tu/t	S
SOIL-O-7-SS-1.0	All detected SVOCs	ſ	S
SOIL-O-7-SS-1.0RE	All SVOCs	fU/f	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		S	2	
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	×		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria			
	and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection.			
	RPD failures may be flagged "J" (+ only)	-	-	

Several analytes were outside QC limits for the MS/MSD sample, however the LCS was within QC limits; therefore, no qualification of data was required.

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	N _o	NA
9.1	Is an LCS recovery form present?	X		
.9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	X		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

10.0 Internal Standards (Code I)

10.1 Are internal standard area of every sa Area > +100% Positive J Non-detect None The method specification is for the α				
Area > +10 Positive J Non-detect None The method specification is for the	every sample and blank within upper and low	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	x	
Positive J Non-detect None The method specification is for th	+100% Area < -50%	Area < -10%		
Non-detect None The method specification is for the	ſ	ſ		
The method specification is for the	UJ	R		
	or the continuing calibration to be compared	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to		
Note: continuing calibration. Thus, if a	if all other QC specifications are met for a g	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the		
reviewer may choose not to flag i	reviewer may choose not to flag individual samples in this case.			
10.2 Are retention times of internal standards within	standards within 30 seconds of the associated calibration standard?	ed calibration standard?	X	
Action: The chromatogram must	nust be examined to determine if any false po	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude,		
the reviewer may consider partial	the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction	ects in that sample/fraction.		

Note:

11.0 TCL Identification (Code W)

		1 53	Y.
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?		×
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do		
711.7	sample and standard relative ion intensities agree within 30%?		×
		Of the state of the state of the	

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		res No NA	00	NA
12.1	Are RLs used consistent with those specified in the QAPP?			Х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		NA INA	2	₹.
13.1	Were any field duplicates submitted for SVOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			
Note:	Samples AT-P-4-SB-4, AT-P-2-SS-0.5, and Soil-O-4-SS-0.5 were the parent samples of AT-P-4-SB-4-D. AT-P-2-SS-0.5-D. and Soil-O-4-SS-0.5-D	7-4-SS-0 5	ļ.	

Samples AT-P-4-SB-4, AT-P-2-SS-0.5, and Soil-O-4-SS-0.5 were the parent samples of AT-P-4-SB-4-D, AT-P-2-SS-0.5-D, and Soil-O-4-SS-0.5-D.

14.0 Data Completeness

		re	res No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	nple) x		
14.2	Number of samples:			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)			
	% Completeness 100			

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer: Bart Brandenburg

Date: 9/2/2005

Severn Trent Laboratory - Savannah

Laboratory

Project Name: Project Number: SDG No.:

Review Level:

Sauget - Area 2 21561511.60011 SAS 020 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on LCS and MS/MSD recoveries.

Field IDs: AT-P-4-SB-4 SOIL-0-4-SB-5.5

AT-P-4-SB-4-D AT-P-2-WS-10

SOIL-0-5-SB-5.5

SOIL-0-7-SB-6.0

1.0 Chain of Custody/Sample Condition

1.1	Do Chain-of-Custody forms list all samples analyzed?	X	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	x	
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,		
1	analytical problems or special circumstances affecting the quality of the data?	×	

The laboratory case narrative indicated that the LCS and MS/MSD had recoveries outside QC limits Note:

2.0 Holding Time/ Preservation (Code H)

	The state of the s	3		
2.1	Do sample preservation, collection and storage condition meet method requirement?	×		i
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
, ,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		M	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

	The second secon	Yes	ŝ	AZ AZ
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results (TCL)?		X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Z

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			Х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		S	WI ON	W
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			•
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

٠	The state of the s	S I	2	₹.
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			×
	If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For $\%D > 50\%$, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sample	s listed on the ap	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	mmary Form ?	X		
7.2	Are surrogate	recoveries within	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	he QAPP for all samples?	Х		
7.3	If No in Section	on 7.2, were these	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	analyzed?		٠	х
7.4	If No in Section	If No in Section 7.3, is any sample of	ple dilution factor greater than 1	dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			х
		> UCL	10% to LCL	<10%	-		
	Positive	J.	J	ſ			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		S	TCS IVA	E.
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. Net Dianutes may be magged of (+ only)			
Note:	The PCB MS/MSD sample AT-P-2-WS-10 had several analytes that were well outside OC limits. Outlifications are listed below.	low.		

The PCB MS/MSD sample AT-P-2-WS-10 had several analytes that were well outside QC limits. Qualifications are listed below.

MS/MSD Limits	30-130	40-140	40-140	40-140
MS/MSD Recoveries	18 / 2	-28 / -40	-326 / -345	3 / -5
Analytes	DCB Decachlorobiphenyl	Heptachlorobiphenyl	Hexachlorobiphenyl	Octachlorobiphenyl
Field ID	AT-P-2-WS-10	AT-P-2-WS-10	AT-P-2-WS-10	AT-P-2-WS-10

Code	M	M	M	M
Qualifications	J	J	J	J
Analytes	DCB Decachlorobiphenyl	Heptachlorobiphenyl	Hexachlorobiphenyl	Octachlorobiphenyl
Field ID	AT-P-2-WS-10	AT-P-2-WS-10	AT-P-2-WS-10	AT-P-2-WS-10

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		S	9	V.
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	×		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
9.4	If Level IV, verify the % recoveries are calculated correctly.			x
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS Limits	30-130	40-140
LCS Recoveries	29	37
Analytes	Monochlorobihphenyl	Tetrachlorobiphenyl
TCS ID	LCS 680-12541	LCS 680-12541

Field ID	Analytes	Qualification	Code
AT-P-4-SB-4	Monochlorobihphenyl	UJ	Т
AT-P-4-SB-4	Tetrachlorobiphenyl	ſ	Т
AT-P-4-SB-4-D	Monochlorobihphenyl	UJ	Т
AT-P-4-SB-4-D	Tetrachlorobiphenyl	U	Т
SOIL-0-5-SB-5.5	Monochlorobihphenyl	ſ	Т
SOIL-O-5-SB-5.5	Tetrachlorobiphenyl	UJ	Т
SOIL-O-4-SB-5.5	Monochlorobihphenyl	ſ	Т
SOIL-O-4-SB-5.5	Tetrachlorobiphenyl	UJ	7
AT-P-2-WS-10	Monochlorobihphenyl	ı	Т
AT-P-2-WS-10	Tetrachlorobiphenyl	ſ	Т
SOIL-O-7-SB-6.0	Monochlorobihphenyl	ſ	Т
SOIL-O-7-SB-6.0	Tetrachlorobiphenyl	UJ	Т

10.0 TCL Identification (Code W)

	The state of the s	51	T T
101	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the		
10.1			×

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		221	Į.
11.1	Are RLs used consistent with those specified in the QAPP?		×
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
11.4	If Level IV, calculate a sample of positive results to verify correct calculations		

12.0 Field Duplicate Samples (Code F)

	THE PERSON NAMED IN COLUMN TO SERVICE AND ADDRESS OF THE PERSON NAMED IN COLUMN TO SE	23.1	ONI	
12.1	Were any field duplicates submitted for analysis?	X		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-P-4-SB-4-D was submitted as the duplicate for AT-P-4-SB-4.

13.0 Data Completeness

		Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	¥		
13.2	Number of samples: 6			
13.3	Number of target compounds in each analysis:			
13.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			
	% Completeness 100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Bart Brandenburg Reviewer:

9/2/2005 Date: Severn Trent Laboratory - Savannah

Laboratory

No samples were rejected

Major Anomalies:

Project Name:

Project Number: SDG No.:

21561510.60010 Sauget - Area 2 Level III SAS 020

Review Level:

Samples were qualified based on the LCS recoveries.

Field IDs:

Minor Anomalies:

SOIL-0-5-SS-0.5 AT-P-4-SB-4-D AT-P-4-SB-4

SOIL-0-5-SB-5.5 SOIL-0-6-SB-5

SOIL-0-4-SB-5.5

AT-P-4-SS-0.5

SOIL-0-4-SS-0.5

SOIL-0-4-SS-0.5-D SOIL-O-7-SB-6.0 SOIL-O-6-SS-0.5

AT-P-2-SS-0.5-D AT-P-2-SB-6

AT-P-2-WS-10

AT-P-2-SS-0.5

SOIL-O-7-SS-1.0

SOIL-0-7-SS-1.0

1.0 Chain of Custody/Sample Condition

		Yes	N _o	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
J. J.	analytical problems or special circumstances affecting the quality of the data?	×		
Note:	The laboratory case narrative indicated that the LCS had recoveries outside the OC limits			

The laboratory case narrative indicated that the LCS had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		3	2	W 7 L 7
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time		•	
7:7	Table for sample holding time) If yes, J(+)/UJ(-).		A	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?	. 2555.6	X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (Jahoratory "I" flagged) concentrations			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		X es	No	Y Y
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

8/7/2006

5.0 Continuing Calibration (Code C)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			X
5.2	Has a continuing calibration standard been analyzed every 12 hours?			Х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $< 20\%$)?			x
	If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For $\%D > 50\%$, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					153	ONI	INA
6.1	Are all sample	ss listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	orm?	X		
6.2	Are surrogate	recoveries within acceptar	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	o for all samples?	X	-	
6.3	If No in Section	on 6.2, were these sample(If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?	?			X
6.4	If No in Section	on 6.3, is any sample diluti	ion factor greater than 10? (Surre	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			X
		> 0CL	10% to LCL	<10%			
	Positive	J	J	J			
	Non-detect None	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code m - recovery, Code d - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		Х	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)		,	

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS sample had recoveries outside QC limits. Qualifications are listed below.

71-109	67 / 82	6 Pentachlorophenol	LCS 680-12546
LCS Limits	LCS Recoveries		

Code	T	L
Qualification	ſ	ſ
Analyte	Pentachlorophenol	Pentachlorophenol
Field ID	AT-P-4-SB-4	AT-P-4-SB-4-D

9.0 TCL Identification (Code W)

		Yes	No	
0 1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
9.1	calibration?			

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		x es	ON -	NA
10.1	Are RLs used consistent with those specified in the QAPP?			X
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
		W. W. C. C. C. C. C. C. C. C. C. C. C. C. C.		
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			X
		,		
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

11.0 Field Duplicate Samples (Code F)

		SI	ONT	WN
11.1	Were any field duplicates submitted for herbicide analysis?	X		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			
Note:	Samples AT-4-SB-4-D, SOIL-O-4-SS-0.5-D, and AT-P-2-SS-0.5-D were submitted as the duplicate samples for AT-4-SB-4, SOIL-O-4-SS-0.5, and AT-P-2-SS-0.5 respectively.	SOIL-0-4-S	S-0.5, and A	T-P-2-SS-

12.0 Data Completeness

		X es	No.	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	•		
1.2.1	sample)	4		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness 100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
Date:	9/2/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 020
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Field IDs:

Samples were qualified based on holding times and MS/MSD recoveries.

SOIL-O-6-SS-0.5	SOIL-0-5-SB-5.5	SOIL-0-4-SB-5.5	AT-P-4-SS-0.5	SOIL-0-7-SS-1.0	
AT-P-4-SB-4-D	SOIL-0-5-SS-0.5	SOIL-O-4-SS-0.5-D	AT-P-2-SB-6	AT-P-2-SS-0.5-D	
AT-P-4-SB-4	SOIL-0-6-SB-5	SOIL-0-4-SS-0.5	AT-P-2-WS-10	AT-P-2-SS-0.5	SOIL-O-7-SB-6.0

1.0 Chain of Custody/Sample Condition/Raw Data

			ICP		ICP-MS	-	GFAA	١A	S	CVAA-Hg	lg
		Yes	Yes No NA Yes No NA Yes No NA Yes No	Yes	I ON	VA Ye	No No	NA C	Yes	οN	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	×							Ж		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×							X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×							×		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4 \text{ C} + 2 ^{\circ}\text{C}$)	×	!						X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete x documentation, contact the laboratory for explanation/resubmittal.	×							X		
Note.	The Internation										

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the holding time for mercury was exceeded.

2.0 Holding Time (Code H)

		ICP	,P	ICP-MS	TS T	GF	GFAA	C\	CVAA-Hg	4g
		Yes N	No NA Yes	s No	No NA Yes		No NA Yes	Yes	No	NA
7.1	Have any technical holding times, determined from date of collection to date of analysis, been		li di							
2.1	exceeded? (Hg. 28days, other metals: 6 months) See attached Holding Time Table.	r .			3050			×		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time				n Jank	2				
	anienia IVI VIIV	N			2.54		Ų.			

| criteria) J(+)/R(-).

Note: One mercury sample was analyzed outside QC limits. Qualifications are listed below.

Code	Н
Days late	4
Qualification	ſ
Analyte	Mercury
Field ID	SOIL-0-4-SB-5.5

3.0 Instrument Calibration (Code C)

	∀	<u> </u>	×				$\overline{\Box}$	Π	Τ
Hg.	No NA			×	_ ×				L
CVAA-Hg							,		
	No NA Yes						10.1		
A	NA				ļ				
GFAA	ν̈́					0885		5 - 28A	
	Yes								
S	NA								
ICP-MS	No NA Yes								
)I	-								
	No NA Yes	×		×	×	×			
ICP									
	Yes								
		Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	R(+/-) $J(+)/UJ(-)$ $J(+)$ $R(+)$	<65% 65% - 79% 121% - 135% > 135%	<750, 750, 800, 1110, 1250, 1250,
		Are sufficient standards standard; GFAA: blank + t	Are the correlation coeffic	Was an initial calibration Action: If no, use professi narrative.	Was continuing calibration verification whichever is more frequent? Action: I the data and note in reviewer narrative.	Are all calibration standard percent recoveries (ICV Mercury (80%-120%) and other Metals (90%-110%).	Action:	Mercury	Other Metals
		3.1	3.2	3.3	3.4	3.5			

Note

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ĭ	ICP	IC	ICP-MS		GFAA		CVAA-Hg	-Hg
		Yes N	No NA Yes	-	No N	No NA Yes		No NA Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per	*						*		
·	batch, per matrix and per level)?						Z81	•		
,	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value	<u>美</u>		-2.0	V.		41. 4. 1917		88.	
4:4	are determined for positive and negative blank values.	Y		1.15%					▼	
13	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to	,					5.0	,		
f.,	determine affect on the data note in reviewer narrative.	¥					: ::::::::::::::::::::::::::::::::::::	4		
	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours						18864-1			
4.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on x	×					8 (k)	×	18.	
	the data to note in reviewer narrative.	500 500 700				9. V	2.7			
37	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the	-		2:50						*130612
f.+	blank value are determined for positive and negative blank values.	x	20	#E, e,3₩					*	robork st
. 46	Are there samples with concentrations less than five times the highest level in associated			24 X					1	Police at the
4.0	blanks? Action: If yes, U at reported concentration.	(Al-	0.00	roge.					×	nding resur
7.7	Are there samples with non-detect results or with concentrations less than five times the most		4.5		188					2000.21
·+	negative value in associated blanks? Action; If yes, J(+)/UJ(-).	<u> </u>		2 11					Y	College

Note:

5.0 ICP Interference Check Sample (ICS) (Code N)

								ICP		ICP-MS	S	0	GFAA		CVAA-Hg	-Hg
							Yes	No	No NA Yes No NA Yes No NA Yes No NA	%	NA	Yes	No N	A Yes	No	NA
5.1	Was ICS A	B analyzed at	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at	ICP run (or a	t least twice ever	y 8 hours), and at				Q1,~¢					_	
7.1	the beginning	ng or once ev	the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	ver is more fr	equent) for ICP-N	AS?			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	J. 181						
5.2	Are the ICS	Are the ICS AB recoveries within	es within 80% - 120%?	1%5					×	aius						
5.3	Are the resu	ults for unspik	Are the results for unspiked analytes (in ICS A) < + IDL?	(A)<+IDL?					×	2.439				_	_	
5.4	If not, are t	he associated	f not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the	and Mg conc	entrations less tha	in the level in the			×	Speciel Control						
	ICS3						100								_	
	Action:	Not Spik	Not Spiked Analytes	Spiked	Spiked analytes (ICS AB analytes)	analytes)				#885°						
2 1		<-IDT	> IDE	< 50%	20% - 79%	> 120%				2812						
		(-)fn	J(+)	R(+/-)	J(+)/UJ(-)	J(+)				260-31					_	

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

				ICP		ICP-MS		GFAA	CV	CVAA-Hg	b 0
			Yes	No N.	A Yes	No	IA Yes	Yes No NA Yes No NA Yes No NA Yes No NA	A Yes	°Z	ΑĀ
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, x per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	0 samples, per batch, d with LCS results.	×					22 58 17 89	×		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)	- 120% - except Ag		x						и	
	Action: Solid Aqueous										
	<pre><lcl> UCL < 50% 50%-79%</lcl></pre>	> 120%									
	J(+)/UJ(-) $J(+)$ $R(+/-)$ $J(+)/UJ(-)$	J(+)								11/31	

7.0 Laboratory Duplicates (Code K)

		ĭ	ICP	Ш	ICP-MS	S	Đ.	GFAA	Н	CVAA-Hg	4-Hg
		Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	N ON	4 Yes	No	NA	Yes	No N	VA Ye	z	Z o
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20		_		8.10 %	S N IS					L
7.1	samples, per batch, per matrix and per level)? Action: If no, J(+), with professional	×			(V.) W./964	1.188	- 12 - 120 - 100			×	
	judgment, analytes not associated with Duplicate results.				· zho:	J-90.00 A					
7.3	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional	285								W.	3
7:/	judgment. Note in worksheet.	3138	*				8 <u>,7,838</u> 5			×	1192
1.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm $ PQL										_
C:/	for aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	×				00.00.000			A		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.		-								<u> </u>
Note:	Samples AT-P-2-WS-10 and AT-P-4-SS-0.5 were analyzed as the duplicate samples.										

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

					_	ICP	_	ICP-MS	2	5	GFAA	_	CVAA-Hg	Hg
					Yes	No NA Yes	\Yes	Ī	No NA Yes	Yes	No N	No NA Yes		No NA
	Was a spiked s	sample prepared and a	analyzed at the correct freque	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per				agarorn	gavi				* .	
8.1	batch, per mat	rix and per level)? 4	Action: If no, J(+), with pre	batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes	×			38820	7 103			×	. 276	
	not associated	not associated with matrix spike results.	sults.					75.24	3/	Secretaria de la constante de			2.0	
63	Was a field !	blank used for the	MS analysis? Action: If	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional						10.00			(C) M (C) M (C) M	
7:0	judgment. Not	udgment. Note in worksheet.			1500	₹.							4	
	Note: Matrix	spike analysis may bo	e performed on a field blank	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous				ANT WORKS						
	sample in an SDG.	DG.			2 :			in special des						
	For all analyte	es with sample conce	entration < 4 x spike concer	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries	,			388						
8.3	within the cont	within the control limit of 75-125%?	? (No control limit applies t	(No control limit applies to analytes with concentration		×		Si	J.A853			×		
	> 4 x spike concentration.)	ncentration.)						18000	and the					
		%R > 125%	30% < %R < 74%	%R < 30%				Y. 17 (18)	annoniter:				\$65.	
	Positive	J	ĵ	J										
	Non-detect	None	U	R				***	0.74.000				#-X	
						۱		ļ	ا		1			

Samples AT-P-2-WS-10 and AT-P-4-SS-0.5 were spiked and analyzed with several recoveries outside QC limits. Qualifications are listed below. Note:

Field ID	Analyte	MS/MSD Recoveries	MS/MSD Limits
AT-P-4-SS-0.5	Antimony	47 / 47	75-125
AT-P-4-SS-0.5	Barium	81/-6	75-125
AT-P-4-SS-0.5	Nickel	32 / 44	75-125
AT-P-4-SS-0.5	Potassium	133 / 124	75-125
AT-P-4-SS-0.5	Sodium	74 / 74	75-125
AT-P-2-WS-10	Antimony	52 / 45	75-125
AT-P-2-WS-10	Barium	341 / 67	75-125
AT-P-2-WS-10	Cadmium	23 / 109	75-125
AT-P-2-WS-10	Manganese	54 / 12	75-125

Code	M	M	M	M	M	M	M	M	M
Qualification	ſ	J	ſ	Ĵ	J	ſ	ſ	ſ	J
Analyte	Antimony	Barium	Nickel	Potassium	Sodium	Antimony	Barium	Cadmium	Manganese
Field ID	AT-P-4-SS-0.5	AT-P-4-SS-0.5	AT-P-4-SS-0.5	AT-P-4-SS-0.5	AT-P-4-SS-0.5	AT-P-2-WS-10	AT-P-2-WS-10	AT-P-2-WS-10	AT-P-2-WS-10

9.0 Instrument Detection Limits (IDL)

		ICP		ICP-MS	S	GFA	JFAA	C	/AA-Hg	Ig
	Yes	No N	A Yes	No	NA	l sə/	No NA	Yes	No	ΑN
OL equal to or less than the reporting limits specified?		×			- 200		-			×

9.1 Note:

10.0 ICP Serial Dilutions (Code S)

			ICP	\vdash	ICP-MS		GF	AA	GFAA CVAA-Hg	VAA	-Hg	_
		Yes	N _o N	Yes No NA Yes No NA Yes No NA Yes No NA	No	NA Y	es N	N of	4 Yes	No	NA	
10.1	Were serial dilutions performed?	×										_
10.2	Was a five-fold dilution performed?	X									Ĺ	_
103	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in						\vdash	H		L		_
10.3	the original sample? If no, J(+).	и										
Note:	Samples AT-P-4-SB-4, AT-P-2-WS-10, and SOIL-0-7-SS-1.0 was diluted and analyzed, all %Ds were within QC limits.	%Ds we	re wit	nin QC Ii	mits.							7]

Samples AT-P-4-SB-4, AT-P-2-WS-10, and SOIL-0-7-SS-1.0 was diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

		Yes 📗	<u>z</u> 2	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	%	NA	(es)	<u>Ż</u>	A Yes	<u>%</u>	Ň	
11.1	Were any field duplicates submitted for metal analysis?	×			93.000	1886.3			*			
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$)	×			April V +1				*		-	
Note:	Samples AT-P-4-SB-4, AT-P-2-SS-0.5, and SOIL-O-4-SS-0.5 were the parent samples of AT-P-4-SB-4-D. AT-P-2-SS-0.5-D. and SOIL-O-4-SS-0.5-D.	P-4-SB	14-D.	AT-P-2	-SS-0.5	- D. ar	IIOS P	0 4	SS-0	<u>ا</u>		7

CVAA-Hg

GFAA

ICP-MS

ICP

Samples AT-P-4-SB-4, AT-P-2-SS-0.5, and SOIL-O-4-SS-0.5 were the parent samples of AT-P-4-SB-4-D, AT-P-2-SS-0.5-D, and SOIL-O-4-SS-0.5-D.

12.0 Result Verification (Code Q)

		1	L.F.	_	ICF-MS	S	כ	JFAA		CVAA-Hg	1-Hg
		Yes 1	N oN	A Yes	oN .	NA	Yes	No	VA Y	es	o NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			×							
12.2	Were all dilution reflected in the positive results and detection limits?		Ë	×			Sizilor) establica				

Note:

13.0 Data Completeness

	CONTRACTOR OF THE PROPERTY OF		ŀ	ŀ	ŀ
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for				
13.1	aqueous sample, 90% for soil sample)				
13.2	Number of samples:	16	0	0	16
13.3	Number of target compounds in each analysis:	22	0	0	-
13.4	Number of results rejected and not reported:	0	0	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$:
	% Completeness	100	####	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:Bart BrandenburgDate:9/6/2005LaboratorySevern Trent Laboratory - SavannahTest Name:AmmoniaMethod No.:350.1

Sauget - Area 2 21561510.60011 SAS 020 Level III

Project Name: Project Number:

Review Level:

SDG No.:

Major Anomalies:

No samples were rejected

Minor Anomalies:

Field IDs:

No samples were qualified in this SDG.

SOIL-0-6-SS-0.5	SOIL-0-5-SB-5.5	SOIL-0-4-SB-5.5	AT-P-4-SS-0.5	SOIL-O-7-SS-1.0	
AT-P-4-SB-4-D	SOIL-O-5-SS-0.5	SOIL-O-4-SS-0.5-D	AT-P-2-SB-6	AT-P-2-SS-0.5-D	
AT-P-4-SB-4	SOIL-0-6-SB-5	SOIL-O-44-SS-0.5	AT-P-2-WS-10	AT-P-2-SS-0.5	SOIL-O-7-SB-6.0

1.0 Chain of Custody/Sample Condition

1.1 Do Chain-of-Custody forms list all samples analyzed? 1.2 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained? 2.2 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?			2	2.7	4 74 7
Are all Chain-of-Custody f Do the Traffic Reports, che analytical problems or spec	1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
Do the Traffic Reports, cha analytical problems or spec	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
analytical problems or special circumstances affecting the quality of the data?	-	, cha	es,		
	1.3	analytical problems or special circumstances affecting the quality of the data?		×	

2.0 Holding Time/ Preservation (Code H)

		xes	xes NO NA	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated	ted		
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
ť	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time	ime		
7:7	Table for sample holding time) If yes, J(+)/UJ(-).	\$5.54 S	X	:
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

3.1 Is a				
	Is a Method Blank Summary form present for each batch?	X		
3.2 Do a	Oo any method blanks have positive results?		X	
3.3 Do a	00 any field/rinse/equipment blanks have positive results?		X	
Acti	ction: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL	RL		
for e	for estimate (laboratory "J" flagged) concentrations.			
3.4 If LA	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

	The state of the s	I CS	I CS I NO	W
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		S	2	W
5.1	Are Continuing Calibration Summary forms present and complete?	÷		×
5.2	Has a continuing calibration standard been analyzed every 10 samples?			×
5.3	Do any analytes have a %R outside QC limits (80-120%)?			×
	If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For $\%$ R $< 50\%$, flag R.	ني		
5.4	If Level IV, calculate a sample of %Rs.			

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	6.1 Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	x		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matriRecoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

Note: Samples AT-P-2-WS-10 and AT-P-4-SS-0.5 were spiked and analyzed as MS/MSD samples.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		res	res NO NA	NA.
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

8.0 Analyte Identification

		Yes	No	NA
8.1	RT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in			×

Note:

9.0 Analyte Quantitation and Reported Detection limits

		Yes	No	NA
9.1	Are RLs used consistent with those specified in the QAPP?			x
9.5	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			Х
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

10.0 Field Duplicate Samples (Code F)

		Yes	So No	W Y
10.1	Were any field duplicates submitted?	x		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	×		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Samples AT-P-4-SB-4, SOIL-O-4-SS-0.5, and AT-P-2-SS-0.5 were the parent samples for AT-P-4-SB-4-D. SOIL-O-4-SS-0.5-D, and AT-P-2-SS-0.5-D.

11.0 Laboratory Duplicates (Code K)

Note:

		Yes	°Z	ΥZ
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	*		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		×	
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	*		

Note: Sample SOIL-O-7-SS-1.0 was analyzed in duplicate.

12.0 Data Completeness

		Yes	Š.	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	6 for soil X		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness 100			

			v.
•			

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

9/1/2005 Severn Trent Laboratory - Savannah Bart Brandenburg Laboratory Reviewer: Date:

Sauget - Area 2

21561510.60011 SAS 021 Level III

Project Number: Project Name:

Review Level: SDG No.:

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

AT-P-4-NAPL

1.0 Chain of Custody/Sample Condition

		T CS	70	VII
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

2.0 Holding Time/ Preservation (Code H)

2.1	Do sample preservation	Do sample preservation, collection and storage condition meet method requirement?	condition meet meth	od requirement?	×		
	If sample preservation	n and/or temperature was	inappropriate (i.e., <	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or			
	temperature is outside	the range 0° (but not fro	zen) to 10° flag all p	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds	temperature exceeds 10°, flag positive detections "J" and non-detects "R".	ins "J" and non-detect	s "R",		,	
2.2	Have any technical ho	olding times, determined	from sampling to date	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		×	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical ho	olding times been grossly	(twice the holding tin	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		I CS	2	MM
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			×
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			×
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			×

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	N _o	NA
4.1	4.1 Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		×	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		×	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-	3		
	butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
	"J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

5.0 GC/MS Initial Calibration (Code C)

					1			I
UNI	Х	х		×		X		
THE NAME OF THE STATE OF THE ST								
~								
	Are Initial Calibration summary forms present and complete for each instrument used?	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders	INCERCIONES OF ACCOUNTS (1) Yes, $J(+)/N(-)$.	5.4 Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	
	5.1	5.2		5.3		5.4	5.5	

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $< 20\%$)?			×
·	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			х
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					res	INO	NA
7.1	Are all sample	s listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	orm?	X		
7.2	Are surrogate	recoveries within acceptance	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	Programmes of the second secon	X		
7.3	If No in Section	If No in Section 7.2, were these sample(s)	sample(s) or method blank(s) reanalyzed?	i		,	×
7.4	If No in Section	on 7.3, is any sample dilutio	on factor greater than 10? (Surre	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
	Note: If SMC	recoveries do not meet acc	eptance criteria in samples chos	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required	equired.	;				
		> NCT	10% to LCL	< 10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	UJ	R			

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		3	2	
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			Х
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	Yes No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $L(-L, J(+)/U)(-)$; $L(-L, J(+)/U)(-)$. KPD Tallures snould be Inagged $J(-L, J(+)/U)(-)$			

Note:

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standar	Are internal standard areas for every sample and blank within upper and lower QC limits?	lank within upper and lowe	er QC limits?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	ſ	ſ			
	Non-detect	None	UI	В			
	The method specific	ation is for the continuing cali	bration to be compared to t	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibratic	on. Thus, if all other QC specif	cations are met for a given	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,			
	the reviewer may ch	the reviewer may choose not to flag individual samples in this case.	uples in this case.	^			
10.2	Are retention times of internal	of internal standards within 30	standards within 30 seconds of the associated calibration standard?	calibration standard?	X		
	Action: The chroma	atogram must be examined to c	letermine if any false positi	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the revie	ewer may consider partial or to	tal rejection of the data for	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

11.0 TCL Identification (Code W)

		S	100	4	
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			×	
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			×	

Z

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		7	
12.1	Are RLs used consistent with those specified in the QAPP?		x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?		х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		X
12.5	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

13.0 Field Duplicate Samples (Code F)

		 	* * *	_
13.1	Were any field duplicates submitted for VOC analysis?	Х		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		х	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			
				,

Note:

14.0 Data Completeness

			Yes	No NA	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	% for soil	X		
14.2	Number of samples:				
14.3	Number of target compounds in each analysis:				
14.4	Number of results rejected and not reported:				
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness 100				

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Sauget - Area 2 21561510.60011 SAS 021 Project Number: Project Name: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 9/1/2005 Laboratory Reviewer: Date:

Level III

Review Level:

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on holding times and method blank contamination.

AT-P-4-NAPL Field IDs:

1.0 Chain of Custody/Sample Condition/Raw Data

CVAA-Hg

ICP-MS

ICP

		Yes	No N	4 Yes	No	NA Y	Yes No NA Yes No NA Yes No NA Yes No NA	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	×			*****			_	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×							X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×							×		
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4 + 2 + 2 = 0$)	×			Colonia marina				×		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete x documentation, contact the laboratory for explanation/resubmittal.	¥							и		
Note:	The laboratory case narrative indicated that the method blank had detections, and that holding times were outside the QC limits	mes we	re outs	ide the	QC lin	nits.					

The laboratory case narrative indicated that the method blank had detections, and that holding times were outside the QC limits.

2.0 Holding Time (Code H)

			ICP		ICP-MS		GFAA	C	CVAA-Hg	Jg.
		es	No N	A Yes	Yes No NA Yes No NA Yes No NA Yes No NA	A Yes	No N	4 Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.	**************************************	¥		·			x		
	Action: $J(+)/UJ(-)$. If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$.	**************************************								

Note: One sample had mercury analyzed outside holding time criteria. Qualifications are listed below.

·	
Code	Н
Qualification	ì
Days late	5
Analyte	Mercury
Field ID	AT-P-4-NAPL

3.0 Instrument Calibration (Code C)

Hg	NA		×	×	×	×			
CVAA-Hg	No								
Ö	No NA Yes								
Α	NA						_		
GFAA	No	.45%			,				138
	No NA Yes								
ICP-MS	/N 0		-		<u> </u>				┞
ICP	N S								
	IA Ye	×		×	×	×			
ICP	No NA Yes								
	Yes								
		Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard: GFAA: blank + three standards; CVAA: blank + five standards)	or GFAA and CVAA) Action: J(+)/UJ(-).	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	J(+)/UJ(-) $J(+)$ $R(+)$	65% - 79% 121% - 135% > 135%	75% - 89% 111% - 125% > 125%
		Are sufficient standards included in the calibration curve? (ICP/GFA: blank + three standards; CVAA: blank + five standards)	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).	Was an initial calibration verification (Il Action: If no, use professional judgment t narrative.	Was continuing calibration verification (C whichever is more frequent? Action: If n the data and note in reviewer narrative.	Are all calibration standard percent recoveries (IC Mercury (80%-120%) and other Metals (90%-110%).	Action: R(+/-)	Mercury <65%	Other Metals <75%
		3.1	3.2	3.3	3.4	3.5			

Note

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		ICP-MS	S	GFAA		CV/	CVAA-Hg	50
		Yes	No	No NA Yes		No NA Yes		No NA Yes		No	NA
4 1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per	,						350	,	_	
1:1	batch, per matrix and per level)?	4			(28				¥		
1.7	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value										
7:4	are determined for positive and negative blank values.	×								×	
13	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to		-				200			\vdash	
r	determine affect on the data note in reviewer narrative.	₹							×		
	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours	Š	-				7. X.				
4.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on	×							×		
	the data to note in reviewer narrative.							(387)			
7	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the										
ĵ.	blank value are determined for positive and negative blank values.	×								A	
46	Are there samples with concentrations less than five times the highest level in associated	P	,								
P	blanks? Action: If yes, U at reported concentration.		*						541 <i>9</i> 8	×	
7 7	Are there samples with non-detect results or with concentrations less than five times the most	3t							SUM		
· -	negative value in associated blanks? Action; If yes, J(+)/UJ(-).		×						(1127)	×	
								l			

Several target analyte values were detected above the IDL. Qualifications are listed below. Note:

W RL Code	1.1 P	- d
Qualification Ne	Ω	Ω
Analyte	Lead	Sodium
Field ID	AT-P-4-NAPL	AT-P-4-NAPL

5.0 ICP Interference Check Sample (ICS) (Code N)

S.1 Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS? S.2 Are the ICS AB recoveries within 80% - 120%? Are the results for unspiked analytes (in ICS A) < + IDL? If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS? Action: Not Spiked Analytes Spiked analytes (ICS AB analytes) Action: Action: Not Spiked Analytes Spiked analytes (ICS AB analytes) Action: UJ(-) I(+) I(+) I(+) I(+) I(+) I(+) I(+) I(+									ICP		ICP-MS	4S		GFAA		CVAA-Hg	-Hg
								Yes	2 %	IA Yes	No	NA	Yes	No	VA Ye	NC	NA
	5.1	Was ICS A	B analyzed at	beginning of each I	CP run (or at	: least twice every	8 hours), and at the		_						_	-	
	1::	beginning c	r once every	8 hours (whichever	is more frequ	ent) for ICP-MS	•			<u></u>							
	5.2	Are the ICS	AB recoverie	es within 80% - 120	2%					×					\vdash	ļ	
	5.3	Are the resu	alts for unspik	red analytes (in ICS	A) < + IDL?					×					_		
Not Spiked Analytes Spiked analytes (ICS AB an extension of the control	5.4	If not, are 1 ICS?	the associated	l sample Al, Ca, Fe,	, and Mg coi	ncentrations less	than the level in the			×							
> IDL < 50% 50%-79% J(+) R(+/-) J(+)/UJ(-)		Action:	Not Spike	ed Analytes	Spiked	analytes (ICS AI	3 analytes)								_	\vdash	
R(+/-) $J(+)/UJ(-)$			<-IDF	> IDL	< 50%	20% - 79%	> 120%				avs.				_		
Transport of the Control of the Cont			UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)									_	

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

									ICP		ICF	ICP-MS		GFAA	C	CVAA-Hg	1g
								Yes	No	NA 3	es 📗	N O	4 Yes	Yes No NA Yes No NA Yes No NA Yes No NA	Yes	No	NA
6.1	Was an LCS prepared and analyzed at the matrix and ner level)? Action: If no If	pared and	d analy	zed at the cor	rect frequer	he correct frequency (one per 20 samples, per bit (+) any sample not associated with I CS results	the correct frequency (one per 20 samples, per batch, per (+) any sample not associated with I CS results	×	999.20						×		
	or red pure wrent	3		11 110, 5(·) mi	J commission of	in sociated in	ii Doo loomo:			ž							l
6.2	Is any LCS recovery outside the control Sb; Solid limits: as per EPA-EMSL/LV)	very outsi as per EP	ide the		s? (Aqueou	ıs limits: 80% -	limits? (Aqueous limits: 80% - 120% - except Ag and		×						_	×	
	Action:	So	Solid			Aqueous											
	V	CTCT > NCT) v	CL	< 50%	50% - 79% > 120%	> 120%										
	+)f	J(+)/(1)(-)	ř	(+)	R(+/-)	J(+)/UJ(-)	J(+)										

Note:

7.0 Laboratory Duplicates (Code K)

			ICP	\square	ICP-MS		GFAA	C	CVAA-Hg	-Ig
		Yes	No N∕	Yes	Yes No NA Yes No NA Yes No NA Yes No NA Yes	A Yes	No N	4 Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20				(7,000					
7.1	samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, x	×			97, 300°Y			×		
	analytes not associated with Duplicate results.				000 PCP					
7.7	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional									
7.7	judgment. Note in worksheet.		4						4	
2 7	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for	,								
٠.,	aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids) Action: If no, J(+).	4						4		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.		_		3//9/2-					

Note: All duplicate samples were not associated with this SDG.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

			ICP	J.	I	ICP-MS	S	9	GFAA		CVA	CVAA-Hg	50
		Yes	$\overline{}$	o NA	No NA Yes	No	NA	No NA Yes	No NA Yes	NA 3		No	NA
	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per	s, per								8,785			
8.1	batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	es not	×						-			×	
	associated with matrix spike results.			\dashv					\exists	- 33			
. (0	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment.	ment.)									>
7.0	Note in worksheet.			4									•
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous	neons						2881-2					
	sample in an SDG.			. 100 S									
	For all analytes with sample concentration $< 4 \times \text{spike}$ concentration, are spike recoveries	veries							_				
8.3	within the control limit of 75-125%? (No control limit applies to analytes with concentration >	tion >		×									×
	4 x spike concentration.)											\dashv	
	%R > 125% 30% < %R < 74% %R < 30%		: A										
	Positive J J		Sivi			Coldway						-	
	Non-detect None UJ R			Щ						2,000			

Note:

9.0 Instrument Detection Limits (IDL)

		ICF	_	ICF-IVIS	CIVI		GFAZ	A	2	CVAA-HB	bn
	Xes	No]	VA Ye	z	o NA	Yes	No	NA	les	No.	Ν
Are all IDL equal to or less than the reporting limits specified?			×								×

Note:

9.1

10.0 ICP Serial Dilutions (Code S)

			ICP		ICP-MS	S	GFAA	ΙA	C	CVAA-Hg	Hg
		Yes	No.	Yes No NA Yes No NA Yes No NA Yes No NA	No	NA Y	N S	NA c	Yes	No	NA
10.1	Were serial dilutions performed?	×						_			
10.2	Was a five-fold dilution performed?	X									
10.3	Did the serial dilution results agree within 10% for analyte concentration $> 50 \times 10^{-5}$ the IDL in the original sample? If no, $J(+)$.	x				-					

Sample AT-P-4-NAPL was diluted and analyzed, all %Ds were within QC limits.

11.0 Field Dup	11.0 Field Duplicate Samples (Code F)		ICP)I	ICP-MS		GFAA	Ŀ	CVAA-Hg	-Hg
		Yes	No NA Yes No NA Yes No NA Yes No NA	Yes	No N	4 Yes	No N	IA Ye	ž	NA
11.1	11.1 Were any field duplicates submitted for metal analysis?		×						X	
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < \pm 2 x PQL and for solids, RPD < 100% or difference < \pm 4 x PQL)		×							×

Note:

e Q)	
erification (Cod	
12.0 Result V	

		res N	No NA	Yes	I ON	VA Ye	es No	NA	Yes	°N N	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?		×								×
12.2	Were all dilution reflected in the positive results and detection Jimits?		×							_	×

CVAA-Hg

GFAA

ICP-MS

Ω̈́

Moto:

13.0 Data Completeness

12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for				
13.1	aqueous sample, 90% for soil sample)				
13.2	Number of samples:	-	0	0	-
13.3	Number of target compounds in each analysis:	22	0	0	-
13.4	Number of results rejected and not reported:	0	0	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100	####	####	100

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Bart Brandenburg Reviewer: Date:

10/5/2005

Severn Trent Laboratory - Savannah Laboratory

Sauget - Area 2

Project Number: Project Name:

21561510.60011 SAS 022

Level III

Review Level: SDG No.:

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

Field IDs:

TB-22

AT-Q-20-SB-6-FB

TB-23

1.0 Chain of Custody/Sample Condition

		Yes	ž	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X	-	
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

2.0 Holding Time/ Preservation (Code H)

					S :	WI ON	
2.1	Do sample preservati	on, collection and stora	Oo sample preservation, collection and storage condition meet method requirement?	od requirement?	X		
	If sample preservation	n and/or temperature wa	as inappropriate (i.e., <2	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or			
	temperature is outside	e the range 0° (but not f	frozen) to 10° flag all po	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds	10°, flag positive detect	temperature exceeds 10°, flag positive detections "J" and non-detects "R".	5 "R".			
2.2	Have any technical h	olding times, determine	d from sampling to date	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		×	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical h	olding times been gross	ly (twice the holding tin	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	

3.0 GC/MS Instrument Performance Check (Code T)

		23 1	OAT	WNI
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			x
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			×

No

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		3	017	5
4.1	4.1 Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
	butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
	"J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		x es	No No	Y.
5.1	5.1 Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			×
5.4	5.4 Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	1f Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			X
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $< 20\%$)?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Y es	0 N	NA
7.1	Are all sample	s listed on the appropriate Su	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	2 mac	X		
7.2	Are surrogate	recoveries within acceptance	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	for all samples?	X		
7.3	If No in Section	on 7.2, were these sample(s) o	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	č			×
7.4	If No in Section	on 7.3, is any sample dilution	factor greater than 10? (Surro	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
	Note: If SMC	recoveries do not meet accep	stance criteria in samples chos	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	equired.					
		> UCL 10	10% to LCL	<10%			
	Positive	ſ	J	ſ			
	Non-detect	None	UJ	R			

Note

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		31	WI ON	Z.
8.1	8.1 Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may			
	require rejection. Kr.D ratiures may be magged) (+ only)			

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		3	2	
9.1	Is an LCS recovery form present?	X		
9.2	19.2 Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	9.3 Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

10.0 Internal Standards (Code I)

10.1 Ar							
	re internal standard	Are internal standard areas for every sample and blank within upper and lower QC limits?	nk within upper and lower C	2C limits?	X		
		Area > +100%	Area < -50% Ar	Area < -10%			
Po	ositive	ſ	J.	J			
ž	Von-detect	None	UJ	R			
Ē	he method specifica	ation is for the continuing calibr	ation to be compared to the	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note: co	ntinuing calibration	n. Thus, if all other QC specific	ations are met for a given sa	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,	•		
the	e reviewer may cho	he reviewer may choose not to flag individual samples in this case.	les in this case.				
10.2 Ar	Are retention times of internal	of internal standards within 30 st	standards within 30 seconds of the associated calibration standard?	ibration standard?	X		
Ψ	ction: The chroma	togram must be examined to der	ermine if any false positive:	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large		-	
mí	magnitude, the reviewer may c	wer may consider partial or tota	l rejection of the data for no	consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

11.0 TCL Identification (Code W)

		221	1717
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing		×
	Calibration		
-	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and		
11.2	do sample and standard relative ion intensities agree within 30%?		×

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	No	NA
12.1	12.1 Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
. 12.3	12.3 Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	12.4 Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	12.5 If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for VOC analysis?		×	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			Yes	2	A V
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	soil	X		
14.2	Number of samples:				
14.3	Number of target compounds in each analysis:				
14.4	Number of results rejected and not reported:				
· =-	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness 100				

Moto

SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION WORKSHEET

Severn Trent Laboratory - Savannah Bart Bradenburg 10/5/2005 Laboratory Reviewer: Date:

Project Number: Project Name: SDG No.:

Review Level:

21561510.60011 SAS 022 Level III

Sauget - Area 2

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG

Field IDs:

AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition

		2.7	140	T. T.
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

2.0 Holding Time/ Preservation (Code H)

		7	7.10	4717
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10			
	^O C), then flag all positive results with a "J" and all non-detects "UJ".			
,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table			
7:7	for sample holding time) If yes, $J(+)/UJ(-)$.		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	2.3 Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		×	

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			x
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			-

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

4.1	4.1 Is a Method Blank Summary form present for each batch?	Ä		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		×	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

5.2 Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990? If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R". Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-). 5.4 Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL. 5.5 If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			31	2	5
	5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
	5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
		If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
	5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			×
5.5 If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
	5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

		3	2	5
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			X
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.	<u> </u>		х
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sampl	es listed on the appropri	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	ımary Form ?	X		
7.2	Are surrogate	Are surrogate recoveries within acceptance	tance criteria specified in the	criteria specified in the QAPP for all samples and method blanks?	X		
7.3	Are more thar	n one of either fraction o	Are more than one of either fraction outside the acceptance criteria?	19		X	
7.4	If Yes in Sect.	ion 7.3, are these sample	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	ılyzed?			×
7.5	If Yes in Sect.	ion 7.3, is any sample di	If Yes in Section 7.3, is any sample dilution factor greater than 10?	i			×
	Note: If SMC	recoveries display unac	cceptable recoveries in the M	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids			
	and base/ neu	and base/ neutrals are assessed separately.	tely.				
		> NCL	10% to LCL	< 10%			
	Positive	J	J	l I			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		103	710	T.
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria			
	and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection.			
	RPD failures may be flagged "J" (+ only)			

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	AN
9.1	9.1 Is an LCS recovery form present?	X		
9.2	9.2 Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	X		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).="" rpd<="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
	failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.		-	

Note:

10.0 Internal Standards (Code I)

					Yes	ž	Y Y
1.01	Are internal standare	d area of every sample and blan	ık within upper and lower	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	×		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	ſ	'n	ſ			
	Non-detect	None	UJ	R			
	The method specific	cation is for the continuing calit	ration to be compared to t	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibratic	on. Thus, if all other QC specif	fications are met for a giver	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the			
	reviewer may choos	reviewer may choose not to flag individual samples in this case.	s in this case.				
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	seconds of the associated of	alibration standard?	X		
	Action: The chrom	atogram must be examined to d	etermine if any false positi	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude			
	the reviewer may co	the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	of the data for non-detects	in that sample/fraction.			•

Note:

11.0 TCL Identification (Code W)

		Yes	No.	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			×
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			×

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

	The second secon	3	011	Z I
12.1	Are RLs used consistent with those specified in the QAPP?			×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note

13.0 Field Duplicate Samples (Code F)

	The state of the s	153		WN
13.1	Were any field duplicates submitted for SVOC analysis?		х	
13.2	Were all RPD or absolute difference values within the control limits?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	x		
14.2	Number of samples:			
14.3	4.3 Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$			
	% Completeness 100			

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer: Bart Brandenburg

Date: 10/5/2005

Laboratory - Severn Trent Laboratory - Savannah

Project Name: Project Number:

Review Level:

SDG No.:

Sauget - Area 2 21561511.60011 SAS 022 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs: AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition

1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

2.0 Holding Time/ Preservation (Code H)

		3	2	4 1 1
2.1	Do sample preservation, collection and storage condition meet method requirement?	×		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 ^o C), then flag all positive results with a "J" and all non-detects "UJ".			
11	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, $J(+)/UJ(-)$.		*	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	2.3 Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		×	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	Yes No NA	A A
3.1	1.1 Is a Method Blank Summary form present for each batch?	×		
3.2	Do any method blanks have positive results (TCL)?		X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		x	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	Š	NA
4.1	4.1 Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

5.1	Are Initial Calibration summary forms present and complete for each instrument used?	·	X
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument		×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.		

6.0 Continuing Calibration (Code C)

		S		1
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?		- C.S Case - S S S S S S S S	х
	If yes, a marginal increase in response >20% then J(+) only, a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	- 2	₹ Z
7.1	Are all sample	se listed on the appro	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	y Form?	X		
7.2	Are surrogate	recoveries within ac	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	APP for all samples?	X		
7.3	If No in Sectiv	on 7.2, were these sa	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	zed?			×
7.4	If No in Section	If No in Section 7.3, is any sample of	e dilution factor greater than 10? (Su	dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> NCT	10% to LCL	< 10%			
	Positive	ſ	ſ	1			
	Non-detect None	None	UJ	R		-	:

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		ទ	2	¥.
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

			21.2	
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	Y		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
9.4	If Level IV, verify the % recoveries are calculated correctly.			Х
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

10.0 TCL Identification (Code W)

	Manual Transport	
101	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the	
10.1	continuing calibration?	×

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

11.1	Are RLs used consistent with those specified in the QAPP?		X
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x
11.4	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

12.0 Field Duplicate Samples (Code F)

,		1 53	740	ZVI
12.1	Were any field duplicates submitted for analysis?		х	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

13.0 Data Completeness

			xes	NO NA	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	of for aqueous sample, 90% for soil	•		
1.0.1	sample)				
13.2	Number of samples:	1			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Bart Brandenburg 10/5/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah Laboratory

Project Name:

21561510.60010 Sauget - Area 2

Review Level:

SDG No.:

Project Number:

SAS 022 Level III

No samples were rejected

Major Anomalies:

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs:

AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition

1.1	Do Chain-of-Custody forms list all samples analyzed?	Х		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		н	

Note:

2.0 Holding Time/ Preservation (Code H)

		2	2.13	4 7, 7
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 ^o C), then flag all positive results with a "J" and all non-detects "UJ".			
,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		×	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Xes	No No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	ž	Y A
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		S	•
5.1	5.1 Are Continuing Calibration Summary forms present and complete?		x
5.2	Has a continuing calibration standard been analyzed every 12 hours?		×
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $<$ 20%)?		×
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.		
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.		

6.0 Surrogate Recovery (Code S)

					3	2	Ċ.
6.1	Are all sample	s listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	Form?	X		
6.2	Are surrogate	recoveries within acceptan	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	PP for all samples?	Х		
6.3	If No in Section	on 6.2, were these sample(s	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?	j			x
6.4	If No in Section	If No in Section 6.3, is any sample diluti	on factor greater than 10? (Su	ilution factor greater than 10? (Surrogate recoveries may be diluted out.)			х
		> ncr	10% to LCL	<10%			
	Positive	J	ſ	J			
	Non-detect None	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		2	?	
7.1	7.1 Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
<u>.</u>	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

	The second secon	X es	No	NA
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	×		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	×		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

9.0 TCL Identification (Code W)

	The state of the s	Kes	No	NA	
10	ach reported compound within 0.06 RRT units of the standard RRT in the				
7.1	continuing calibration?			×	

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

10.1 Are RLs used consistent with those sp	4 41 5 1 4 . O A PRO	Control of the second	
	an with those specified in the QAFF?		×
10.2 Are these limits adjus	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
10.3 Are any positives repo	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
10.4 If Level IV, calculate	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	No	NA
11.F	Were any field duplicates submitted for herbicide analysis?		×	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

		 Yes ∣	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	X		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			:
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness 100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Sauget - Area 2 21561510.60011 SAS 022 Level III Project Number: Project Name: Review Level: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 10/5/2005 Laboratory Reviewer: Date:

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs:

AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition/Raw Data

CVAA-Hg

GFAA

ICP-MS

ICP

		Yes	<u>~</u> %	Yes No NA Yes No NA Yes No NA Yes No NA	No	NA	(es]	$\frac{z}{2}$	A Yes	%	NA
1.1	1.1 Do Chain-of-Custody forms list all samples that were analyzed?	X							X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×							×		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		ж			56, Nazest 25.				×	11 - 1888. LT - 3 H /Hz
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4 ^{\circ}\text{C} \pm 2 ^{\circ}\text{C}$)	×							X	100	
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete x documentation, contact the laboratory for explanation/resubmittal.	X							*		

2.0 Holding Time (Code H)

		Ι	J.	ĭ	ICP-MS	J	GFAA	CVA	CVAA-Hg
		es 1	do NA	Yes	No NA	Yes	cs No NA Yes No NA Yes No NA Yes No NA	Yes	2 2
۲ ر	Have any technical holding times, determined from date of collection to date of analysis, been								
2.1	exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		X						×
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)								
	J(+)/R(-).								

Note

3.0 Instrument Calibration (Code C)

							ICP		ICP-MS		GFAA		CVAA-Hg	\-Hg	
						Yes	No NA Yes	A Yes		No NA Yes		No NA Yes	es No		ΑN
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)	cluded in the lards; CVAA:	calibration curve' blank + five stand	? (ICP/ICP-MS: bards)	lank + one standard;		×								
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).	ients > 0.995	(for GFAA and C	VAA) Action: J(-	+)/UJ(-).									<u> </u>	×
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action. If no, use professional judgment to determine affect on the data and note in reviewer narrative.	verification (I	CV) analyzed at tl mine affect on the	he beginning of ea data and note in r	ch analysis? Action: eviewer narrative.		×							,	×
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	n verificatior t? Action: II	(CCV) performe no, use profession	d every 10 analys	sis or every 2 hours, termine affect on the		*								×
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	l percent reco tals (90%-110	veries (ICV and Control)%).	CV) within the cor	ntrol limits? Mercury		×								×
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)							84.5			
	Mercury	< 65%	65% - 79%	121% - 135% > 135%	> 135%									_	
	Other Metals < 75%	< 75%	75% - 89%	111% - 125% > 125%	> 125%									_	

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		ľ	ICP	ICP-MS	9	GFAA	CA	CVAA-Hg	50
		Yes	No NA Yes	 No NA Yes		No NA Yes		N N	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per harch nor matrix and nor level)?	×					×		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for nositive and negative blank values	×						×	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	×					x		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	w 9					*		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	×						×	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		A					×	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, $J(+)/UJ(-)$.	ų.	X					×	
			200						ı

Note:

5.0 ICP Interference Check Sample (ICS) (Code N)

				•				ICP	·	ICP-MS	S	GFAA	Ą	5	CVAA-Hg	ත
							Yes	NoN	Yes No NA Yes No NA Yes No NA Yes No NA	No	NA Y	se NC	NA	Yes	%	NA
1.5	Was ICS A	B analyzed a	t beginning of eac	ch ICP run (or	at least twice ever	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the		-		0.958		-	L			
7.1	beginning c	or once every	8 hours (whicheve	er is more frequ	beginning or once every 8 hours (whichever is more frequent) for ICP-MS?					S. 1. 19						
5.2	Are the ICS	3 AB recoveri	Are the ICS AB recoveries within 80% - 1.	- 120%?				<u> </u>				-				
5.3	Are the resu	ults for unspik	Are the results for unspiked analytes (in ICS A) < + IDL?	3S A) <+ IDL?				_	,,				_			
5.4	If not, are tl	he associated	sample Al, Ca, Fe	s, and Mg conce	entrations less than	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?		 	, i	100,000			<u> </u>			<u> </u>
										200			_			
	Action:	Not Spike	Not Spiked Analytes	Spiked	Spiked analytes (ICS AB analytes)	analytes)		-		258, 9, 5	_		_			
		<-IDL	>IDF	< 50%	50% - 79%	> 120%		_					_			
		(-)n	J(+)	R(+/-)	J(+)/UJ(-)	J(+)	4									
						1100										

Note

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

			ICP		ICP-MS		GFAA	Н	CVAA-Hg	Hg
		Yes	N _o N	A Yes	No	NA Yes	oN :	Yes No NA Yes No NA Yes No NA Yes No NA	No	NA
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no. J(+) any sample not associated with LCS results	er x	ļ <u>.</u>					×		
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)	5;	×						×	
	Action: Solid Aqueous			<u> </u>				\vdash		
	<lcl> UCL <50% 50%-79% > 120%</lcl>									
	J(+)/UJ(-) $J(+)$ $R(+/-)$ $J(+)/UJ(-)$ $J(+)$									

Note:

7.0 Laboratory Duplicates (Code K)

			ICP		ICP-	ICP-MS		GFAA	_	CVAA-Hg	HH
		Yes	No.	Yes No NA Yes No NA Yes No NA Yes No NA	Ž	o NA	Yes	No	NA Ye	Ž s	-
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,	,	Γ		200	L				2.9	┞
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	t x									
	associated with Duplicate results.										
7.7	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional							V 22			30
j: /	judgment. Note in worksheet.		×							×	
7.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for		Г								
j.	aqueous, and RPD < 35% or difference $< \pm 2$ X PQL for solids) Action: If no, J(+).	M									
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.					_	L				L

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

							ICP	<u> </u>	IC.	ICP-MS		GFAA	4	CV,	CVAA-Hg	[g
						Yes	No NA Yes	VA Y		Z 92	No NA Yes		No NA Yes		No	NA
8.1	Was a spik	sed sample prepared	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional indement, analytes not	t frequency (one per 20 h professional judgmen	samples, per t. analytes not		×	×							×	
	associated v	associated with matrix spike results.	sults.													
٥ ،	Was a field	1 blank used for the	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment.	yes, J(+) with professic	nal judgment.			-						2000.90		,
7:0	Note in worksheet.	rksheet.						.						2,536,614		v.
	Note: Mat	Note: Matrix spike analysis may be	may be performed on a fiel	performed on a field blank when it is the only aqueous	only aqueous										, Track	
	sample in an SDG.	n SDG.							<u>(4865-8)</u>						S.	
	For all ana	lytes with sample co	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within	centration, are spike rec	overies within	Segramos										
8.3	the control	limit of 75-125%?	the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike	nalytes with concentrati	on > 4 x spike			×								×
	concentration.)	on.)														
		%R > 125%	30% < %R < 74%	%R < 30%												
	Positive	ſ	ſ	ſ												
	Non-detect	None	UJ	R								28				

Note:

9.0 Instrument Detection Limits (IDL)

Are all IDL equal to or less than the reporting limits specified? No NA Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA Yes NA NA NA NA NA NA NA NA NA NA NA NA NA		ICP	<u>-</u>	S-WS	_	GFAA	ပ —	VAA.	Hg
e all IDL equal to or less than the reporting limits specified?		No NA	Yes	⁄N oN	Yes	No N	AA Yes	Š	NA
	e all IDL equal to or less than the repor	×		_					×

9.1 Note:

10.0 ICP Serial Dilutions (Code S)

)I	ICP	C	ICP-MS		GFAA		CVAA-Hg	Hg
		(es	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	'es	No NA	Yes	NoN	A Yes	No	NA
10.1	10.1 Were serial dilutions performed?		×							
10.2	10.2 Was a five-fold dilution performed?		x							
10.3	Did the serial dilution results agree within 10% for analyte concentration $> 50 \times 10$ the IDL in the original sample? If no, J(+).		×							

11.0 Field Duplicate Samples (Code F)

		1	ICP		ICP-MS	S	E E	GFAA		CVAA-Hg	\-Hg
		Yes	No N	IA Yes		No NA	Yes 1	No	IA Ye	es N	NA C
11.1	Were any field duplicates submitted for metal analysis?		×		35.386					×	├-
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2$ x PQL and for solids, RPD $< 100\%$ or difference $< \pm 4$ x PQL)			×							

Note:

12.0 Result Verification (Code Q)

		ICP		I	CP-MS	S	Ð	GFAA	2	VAA-Hg	Hg
	Yes	ž	NA	Yes	No	NA N	sə/	No.	4 Yes	ů	Ŋ
Were all results and detection limits for solid-matrix samples reported on a dry-weight by	nt basis?		×			ak is				10/2020	×
Were all dilution reflected in the positive results and detection limits?			×							150.00	×

12.1 12.2 Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous					
13.1	sample, 90% for soil sample)					
13.2	13.2 Number of samples:	-	0		0	-
13.3	13.3 Number of target compounds in each analysis:	22	0		0	-
13.4	4 Number of results rejected and not reported:	0	0		0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$					
	% Completeness	100	####	推	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer: Bart Brandenburg

Date: 10/5/2005

Laboratory Severn Trent Laboratory - Savannah

Test Name: Ammonia

Method No.: 350.1

Sauget - Area 2 21561510.60011 SAS 022

Project Name: Project Number:

Review Level:

SDG No.:

Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs: AT-Q-30-SB-6-FB

1.0 Chain of Custody/Sample Condition

			7.10	17.7
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			
C:I	samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

2.0 Holding Time/ Preservation (Code H)

		X es	No NA	Y.
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	Ž	₹ Z
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?	No.	X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	ŝ	₹ Z
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			!
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			l

Note:

5.0 Continuing Calibration (Code R)

		x es	2	₹ Z
5.1	Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 10 samples?			: >
				٧
5.3	Do any analytes have a %R outside QC limits (80-120%)?			
		2005		
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag			
				
5.4	If Level IV, calculate a sample of %Rs.			
		_		

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	Ŝ	V
6.1	6.1 Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other			
•	QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10%			
	may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		ıes	I es NA	∀
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
-	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

8.0 Analyte Identification

		20.1	27.	1	
10	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT				
0.1	in the continuing calibration?			×	
					_

Note:

9.0 Analyte Quantitation and Reported Detection limits

 9.1 Are RLs used consistent with those specified in the QAPP? 9.2 Are these limits adjusted to reflect dilutions and/ or percent solids as required? 9.3 Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J". 9.4 If Level IV, calculate a sample of positive results to verify correct calculations 			res	00	Y Z
	9.1 Are I	RLs used consistent with those specified in the QAPP?			×
9.3 Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J". 9.4 If Level IV, calculate a sample of positive results to verify correct calculations		these limits adjusted to reflect dilutions and/ or percent solids as required?			×
9.4 If Level IV, calculate a sample of positive results to verify correct calculations	9.3 Are a	any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			* *
	9.4 If Lev	evel IV, calculate a sample of positive results to verify correct calculations			

10.0 Field Duplicate Samples (Code F)

		ICS	2	NA.
10.1	Were any field duplicates submitted?		×	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note

11.0 Laboratory Duplicates (Code K)

			2	1717
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		×	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.	-		×
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.	22.0		×

Note:

12.0 Data Completeness

		Yes	N _o	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	X		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:	į		
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)			
	% Completeness		•	

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DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer: Bart Brandenburg

Date: 8/31/2005
Laboratory Severn Trent Laboratory - Savannah

Project Number: SDG No.:

Project Name:

Sauget - Area 2 21561510.60011 SAS 023

Level III

Review Level:

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on internal standard and LCS recoveries, method blank contamination and holding time failures.

Field IDs: SOIL-0-9

IDW-SITES

SOIL-0-10 IDW-AT-Q-32

SOIL-0-8 AT-Q-30-SB-6

1.0 Chain of Custody/Sample Condition

		S	0	Y Y
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms stoned indicating sample chain-of-custody was maintained?			
		¥		
13	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples.			
7::7	analytical problems or special circumstances affecting the quality of the data?	×		

The laboratory case narrative indicated that the MS/MSD, LCS and internal standard recoveries were outside QC limits. Note:

The narrative also indicated that the holding times and method blanks were outside QC limits.

2.0 Holding Time/ Preservation (Code H)

2.1 Do sample preservation, collection and storage condition meet method requirement? If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If temperature exceeds 10°, flag positive detections "J" and non-detects "R". 2.2 Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-). Matrix Preserved Aromatic All others Aqueous No 7 days 14 days Yes 14 days 14 days Soil/Sediment 4 °C ± 2° C 14 days 14 days 14 days							-	
	2.1 Do sar	mple preservation,	collection and storage	condition meet method	requirement?	¥		
	If sam	ple preservation a	nd/or temperature was in	nappropriate (i.e. <2°	>6°C etc.) comment in report. If unpresented or			
	tempe	rature is outside th	ie range 0° (but not froza	en) to 10° flag all posi	tive results with a "I" and all non-detects "III" If			
	tempe	rature exceeds 10°	, flag positive detection	s "J" and non-detects "	R".			
Matrix Preserved Aromatic All or Aqueous No 7 days 14 Yes 14 days 14 Soil/Sediment 4 OC ± 2 OC 14 days 14		any technical hold	ing times, determined fr	om sampling to date o	f analysis, been exceeded? If yes, J(+)/UJ(-).	×		
No 7 days Yes 14 days $4 {}^{0}C_{\pm}2 {}^{0}C$ 14 days	Ma	ıtrix	Preserved	Aromatic	All others	1		
Yes 14 days 4 ⁰ C±2 ⁰ C 14 days	Aq	neons	No	7 days	14 days			
$4^{\circ}C \pm 2^{\circ}C$ 14 days			Yes	14 days	14 days			
	Soil		4 °C ± 2 °C	14 days	14 days			
2.3 Have any technical holding times been grossly (twice the holding time) exceeded? If yes, I(+)/R(-).	2.3 Have a	any technical holdi	ing times been grossly (twice the holding time	exceeded? If ves. J(+)/R(-).		1	

Note: Sample IDW-SITES was reanalyzed outside holding times. Qualifications are listed below.

Code	Н
Days Late	11
Qualification	J/UJ
Analyte	All VOCs
Field ID	IDW-SITES

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA V
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			
		2000 CO. C. C. C. C. C. C. C. C. C. C. C. C. C.		•
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			*
				•
3.3	Have for abundance criteria for BFB been met for each instrument used? If no, flag R.			,
		The state of the s		

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	ž	Ϋ́Z
4.1	Is a Method Blank Summary form present for each batch?	*		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	, A		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		د	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-		4	
	butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
	"J" flagged) concentrations.			•
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: Several method blanks had detections above the MDL. Qualifications are listed below.

Code	Z
New RL	
Qualification	U
Analyte	Methylene Chloride
Field ID	IDW-SITES

5.0 GC/MS Initial Calibration (Code C)

		Yes	ź	Ϋ́Z
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			,
·				<
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			
	1 VALATA 17 - 31			*
	If not, $J(+)/U_1(-)$. In extreme cases, the reviewer may flag non-detects "R".			
43	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for non responders			
J.:J	like ketones or alcohols)? If yes, J(+)/R(-).			×
	1 1 1			
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			>
- 4 4	131 mm 131			٠
2.3	11 Level 1V, recalculate a sample of KKFs and %KSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

		Xes	ž	₹ Z
6.1	Are Continuing Calibration Summary forms present and complete?			>
6.2	Has a continuing calibration standard been analyzed every 12 hours?			• •
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			< >
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			* ×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Vas	SZ.	V.V.
					3	2	W
7.1	Are all samples listed	es listed on the appropr	on the appropriate Surrogate Recovery Summary Form?	mary Form?	X	!	
7.2	Are surrogate recoveri	recoveries within acce	ies within acceptance criteria specified in the QAPP for all samples?	e QAPP for all samples?	4		į.
7.3	If No in Section 7.2, w	on 7.2, were these samp	were these sample(s) or method blank(s) reanalyzed?	lalyzed?			,
7.4	If No in Section 7.3, is	on 7.3, is any sample d	ilution factor greater than 105	s any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out)		-	,
	Moto. If Chil	7					۷
	MAIC II SIAIC	recoveries do not mec	et acceptance criteria in sampi	note. It style recoveries up not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	equired.					
		> NCT	10% to LCL	<10%			
	Positive	f	ſ				Ĺ
	Non-detect	None	m	R	!		-

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	Š.	¥ Z
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	χ		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	*		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		>	
	Sing informed professions independ the date		•	
	Same missing processional judgingly, the data reviewer should use the MS and MSD results in conjunction with other QC	-		
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "I" (+ only)			
			_	

The MS/MSD sample AT-Q-30-SB-6 had 15 out of 36 analytes outside QC limits. The other QC was all within limits. No qualification of data was required. Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No.	N
9.1	Is an LCS recovery form present?	¥		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
9.4	If Level IV, verify the % recoveries are calculated correctly.		:	
	Action for specific compound outside the acceptance criteria: %R>UCL.			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Several LCS analytes were outside QC limits. Qualifications are listed below. Note:

TCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-14101	Chloroethane	211	20-140
LCS 680-14160	Chloroethane	242	20-140
LCS 680-14160	Tetrachloroethene	73	79-132
LCS 680-14404	Acetone	19	28-143
LCS 680-14404	2-Butanone	28	30-149

D Analyte Qualification Code	SB-6 Tetrachloroethene UJ L	-8 Acetone UJ L	-8 2-Butanone UJ L	Q-32 Acetone UJ L	O-32 2-Butanone 111 1
Field ID	AT-Q-30-SB-6	SOIL-0-8	SOIL-0-8	IDW-AT-Q-32	IDW-AT-0-32

10.0 Internal Standards (Code I)

					Yes	Yes No	Y Z
10.1	Are internal standard	Are internal standard areas for every sample and blank within upper and lower QC limits?	hin upper and lower QC	limits?		×	
		Area > +100% Area	Area < -50% Area	Area < -10%			
	Positive	t t		ſ		<u> </u>	
	Non-detect	None UJ		R			
	The method specifics	ation is for the continuing calibration	o be compared to the mi	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibration	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional	are met for a given sam	ple, using informed professional			
	judgment, the review	udgment, the reviewer may choose not to flag individual samples in this case.	amples in this case.		_		
10.2	Are retention times o	Are retention times of internal standards within 30 seconds of the associated calibration standard?	of the associated calibra	tion standard?	X		
	Action: The chromat	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large	e if any false positives or	negatives exist. For shift of a large			
	magnitude, the reviev	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	ion of the data for non-d	etects in that sample/fraction.			
Note:	Several internal stand	Several internal standards are outside QC limits for one sample. Oualifications are listed helow	nple. Oualifications are	isted below			

Several internal standards are outside QC limits for one sample. Qualifications are listed below.

		ŀ	ı	r—	_	_	
,			· 	ΑN	×		×
				Ŝ	į		
Code	I			Yes			
Oualification	J/UJ				its of the standard RRT in the continuing	recent in the cample mass chaotrum. and	TOOTH III THE SMITHIG HIMSS SPECTION, MILE
Internal Standard Low/High	Low				Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass capations, and	intensities agree within 30%?
Analyte	All VOCs		11.0 TCL Identification (Code W)		Is the relative retention time (RRT) (calibration?	Are the three ions of greatest intensi	do sample and standard relative ion intensities agree within 30%?
Field ID	IDW-SITESRA	,	11.0 TCL Ident		11.1	;	11.2

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	°Z	A A
12.1	Are RLs used consistent with those specified in the QAPP?		5	*
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			,
12.4	Are any positives renorted that exceed the linear range of the instruments? If the start of 1111			<
	from the state of			×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			
Note:				

13.0 Field Duplicate Samples (Code F)

		res	ON	¥Z
13.1	Were any field duplicates submitted for VOC analysis?		*	
0 0 1	11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		٠	
13.2	Were all RPD or absolute difference values within the control limits outlined in the OAPP?			,
				<
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil), J(+) only			

Note:

14.0 Data Completeness

			Yes	ŝ	A V
14.1	1s % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	seous sample, 90% for soil	×		
14.2	Number of samples:	9			
14.3	Number of target compounds in each analysis:	22			
14.4	Number of results rejected and not renorted:	CC			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)	0			
·	% Completeness	100			

SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION WORKSHEET

Project Number: Project Name: Severn Trent Laboratory - Savannah Bart Brandenburg 8/31/2005 Laboratory Reviewer:

SDG No.:

Review Level:

21561510.60011 Sauget - Area 2 SAS 023 Level III

Major Anomalies:

Samples were rejected based on LCS recoveries and holding time criteria.

Minor Anomalies:

Samples were qualified based on MS/MSD, LCS, surrogate recoveries, method blank contamination, and hold time criteria.

DW-SITES SOIL-0-9 Field IDs:

IDW-AT-Q-32 SOIL-0-10

SOIL-0-8

AT-Q-30-SB-6

1.0 Chain of Custody/Sample Condition

		res	0	A A
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
-	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt condition of	:		
CI	samples, analytical problems or special circumstances affecting the quality of the data?	×		

Samples were reanalyzed outside of holding time due to internal standards outside QC limits. Note:

The MS/MSD, LCS, and surrogate recoveries were outside QC limits.

2.0 Holding Time/ Preservation (Code H)

,		153	WI ON	INA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "I.I"			
7.7	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).	×		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If ves. I(+)/R(-)	,		

Two samples were re-extracted outside of holding time. Qualifications are listed below. Note:

Code	Н	H
Days Late	38	38
Qualification	Ж	R
Analyte	All VOCs	All VOCs
Field ID	SOIL-0-8RE	IDW-SITESRE

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	Š	N A
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			×
3.2	Have all samples been analyzed within twelve hours of the tune?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			*
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	ŝ	Y V
4.1	Is a Method Blank Summary form present for each batch?	*		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	X		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		٠	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U"		4	
	and the detection limit elevated to the RL for estimate concentrations.	-	-	
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL. Qualifications are listed below.

Per Per	Analyte Qualification New RL Code	Pentachlorophenol U Z	ntachlorophenol	Pentachlorophenol U 2
------------	-----------------------------------	-----------------------	-----------------	-----------------------

5.0 GC/MS Initial Calibration (Code C)

		Yes	°Z	Y Y
5.1	5.1 Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			×
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders			1
C.C	like amines and phenols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			*
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			
			_	

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			*
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			
79	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing			,
r S	calibration RRF outside QC limits (%D < 20%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag			ļ
	R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			+
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			
			ĺ	

Note:

7.0 Surrogate Recovery (Code S)

					221	2	¥
7.1	Are all sampl	es listed on the appropr	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	nary Form?	X	i	
7.2	Are surrogate	Are surrogate recoveries within accep	stance criteria specified in the	acceptance criteria specified in the OAPP for all samples and method blanks?		,	
7.3	Are more than	n one of either fraction o	Are more than one of either fraction outside the acceptance criteria?		*	<	
7.4	If Yes in Secti	ion 7.3, are these sample	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	ZpaZ/		,	
7.5	If Yes in Secti	ion 7.3, is any sample di	If Yes in Section 7.3, is any sample dilution factor greater than 10?			<	
-						×	
	Note: If SMC	recoveries display una	cceptable recoveries in the MS	Note: If SMC recoveries display unacceptable recoveries in the MS and/or diluted samples, then no reanalysis is required			
	and acids and	and acids and base/ neutrals are assess	assessed separately.				
		> ncr	10% to LCL	<10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	m	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SOIL-0-9	2FP, PHL	23 / 28	36-101 / 38-102
SOIL-0-10	2FP, PHL	26/33	36-101/38-102
SOIL-0-8	2FP, PHL	26/33	36-101 / 38-102
IDW-SITES	2FP, FBP, NBZ, PHL, TBP, TPH	17/26/22/20/24/29	-101 / 38-104 / 33-94 / 38-102 / 27-124 / 40-129
IDW-AT-Q-32	2FP, FBP, NBZ, PHL	21/36/29/25	36-101 / 38-104 / 33-94 / 38-102
AT-Q-30-SB-6	2FP, PHL	26/33	36-101 / 38-102

2FP=2-Fluorophenol, FBP=2-Fluorobiphenyl, NBZ=Nitrobenzene-d5, PHL=Phenol-d5, TBP=2,4,6-Tribromophenol, TPH=Terphenyl-d14

Field ID	Analyte	Qualification	Code
8OII-0-9	All Acid/fraction SVOCs	J/UJ	S
SOIL-0-10	All Acid/fraction SVOCs	J/UJ	S
SOIL-0-8	All Acid/fraction SVOCs	J/UJ	S
IDW-SITES	All SVOC	J/UJ	S
IDW-AT-Q-32	All SVOC	J/UJ	S
AT-Q-30-SB-6*	All Acid/fraction SVOCs	lU/I	S

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	N _o	Ϋ́
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	×		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		,	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other OC		•	
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries < 10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			
Note:	The MS/MSD sample AT-Q-30-SB-6 had 61 of its 65 analytes outside OC limits. Oualifications are listed helow			

The MS/MSD sample AT-Q-30-SB-6 had 61 of its 65 analytes outside QC limits. Qualifications are listed below.

·	
Code	W
Qualification	J/UJ
Total number of analytes	65
Number of analytes out	61
Analyte	All SVOCs
	AT-Q-30-SB-6

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		res	NO ON	V
9.1	Is an LCS recovery form present?	X		
9.5	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		×	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).<="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
	RPD failures should be flagged "J" (+ only)			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note: The LCS sample had several analytes outside QC limits. Qualifications are listed below.

Analyte	LCS Recoveries	LCS Limits
.CS 680-13397 2,4-Dinitrophenol	0	1-131
CS 680-13397 Pentachlorophenol	16	27-116
CS 680-13397 Butyl benzyl phthalate	0	43-127
CS 680-13397 3,3'-Dichlorobenzidine	0	1-118
CS 680-13397 Bis (2-ethylhexyl) phthalate		25-134
CS 680-13397 Chrysene	0	46-118
CS 680-13397 Benzo[b]fluoranthene	1	35-122
CS 680-13397 Benzo[k]fluoranthene	0	36-124
CS 680-13397 Benzo[a]pyrene	1	37-120
CS 680-13397 Indeno[1,2,3-cd]pyrene	1	36-133
CS 680-13397 Benzo[g,h,i]perylene	0	41-122

SOIL-0-9 2,4-Dinitrophenol R L SOIL-0-9 Pentachlorophenol J L SOIL-0-9 Butyl berzyl phthalate UJ L SOIL-0-9 3,3-Dichlorobenzidine UJ L SOIL-0-9 Bis (2-cth/lbcxyl) phthalate J L SOIL-0-9 Benzo[s] fluoranthene R L SOIL-0-9 Benzo[s] fluoranthene R L SOIL-0-9 Benzo[s] fluoranthene R L SOIL-0-9 Benzo[s] fluoranthene R L SOIL-0-9 Indeno[1,2,3-cd]pyrene R L SOIL-0-9 Benzo[s] fluoranthene R L SOIL-0-10 Buyl benzyl phthalate J L SOIL-0-10 Buyl benzyl phthalate J L SOIL-0-10 Benzo[s] fluoranthene R L SOIL-0-10 Benzo[s] fluoranthene R L SOIL-0-10 Benzo[s] fluoranthene R L SOIL-0-10 Benzo[s] fluoranthene <	Field ID	Analyte	Qualification	Code
Pentachlorophenol J	SOIL-0-9	2,4-Dinitrophenol	R	Т
Butyl benzyl phthalate R 3,3'-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]hluoranthene R Butyl benzyl phthalate J Butyl benzyl phthalate J Bis (2-ethylhexyl) phthalate J Benzo[b]fluoranthene R Benzo[b]fluoranthene R Benzo[b]fluoranthene R Benzo[b]fluoranthene R Benzo[k]fluoranthene J Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene J Benzo[k]fluoranthene J Benzo[k]fluoranthene J Benzo[k]fluoranthene J Benzo[k]henol J Benzo[k]henol J Benzo[k]henol J Benzo[k]henol J Benzo[k]henol J	SOIL-0-9	Pentachlorophenol	J	Т
3,3'-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[g,h.i]perylene R Benzo[g,h.i]perylene J Pentachlorophenol J Benzo[g,h.i]perylene J Butyl benzyl phthalate J Bis (2-ethylhexyl) phthalate J Benzo[b]fluoranthene R Benzo[b]fluoranthene R Benzo[k]fluoranthene J Benzo[k]fluoranthene J Benzo[k]hiberylene J Benzo[k]hiberylene J Benzo[k]hiberylene J Benzolenel J Benzolenel J	SOIL-0-9	Butyl benzyl phthalate	R	Т
Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[g,h;l]perylene J Benzo[g,h;l]perylene J Pentachlorophenol J Butyl benzyl phthalate J Butyl benzyl phthalate J Bis (2-ethylhexyl) phthalate J Benzo[s]fluoranthene R Benzo[s]fluoranthene R Benzo[s]fluoranthene R Benzo[s]fluoranthene R Benzo[s]hyrene J Indeno[1,2,3-cd]pyrene R Benzo[s]hyrlene J Benzo[s]hyrlene J Benzo[s]hyrlene J Benzo[s]hyrlene J Benzo[s]hyrlene J Benzo[s]hyrlene J Benzo[s]hyrlene J Benzo[s]hyrlene J Benzo[s]hyrlene J	SOIL-0-9	3,3'-Dichlorobenzidine	m	Г
Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Indeno[1,2,3-cd]pyrene R Benzo[g,h,i]perylene J Benzo[g,h,i]perylene J Butyl benzyl phthalate J Butyl benzyl phthalate J Bis (2-ethylhexyl) phthalate J Benzo[b]fluoranthene R Benzo[b]fluoranthene R Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene J Benzo[a]pyrene J Benzo[a]pyrene J Benzo[a]pyrene J Benzo[a]pyrene J Pentachlorophenol J Pentachlorophenol J Butyl benzyl phthalate J Butyl benzyl phthalate J	SOIL-0-9	Bis (2-ethylhexyl) phthalate	ſ	T
Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene J Benzo[g,h,i]perylene J Pentachlorophenol J Butyl benzyl phthalate J 3,3-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Benzo[b]fluoranthene R Benzo[k]fluoranthene J Benzo[k]fluoranthene J Benzo[k,i]perylene J Benzo[k,i]perylene J Benzo[k,i]perylene J Benzol[k,i]perylene J J J Benzol[k,i]perylene J J J Benzol[k,i,i	SOIL-0-9	Chrysene	ſ	T
Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene R Benzo[a,h,i]perylene J 2,4-Dinitrophenol J Pentachlorophenol J Butyl benzyl phthalate J 3,3-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Lindeno[1,2,3-cd]pyrene J Benzo[a,i]perylene J Chrysene J Benzo[a,i]perylene J Pentachlorophenol J Pentachlorophenol J Butyl benzyl phthalate J	8OIL-0-9	Benzo[b]fluoranthene	R	T
Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene R Benzo[g,h,i]perylene J 2,4-Dinitrophenol J Pentachlorophenol J Butyl benzyl phthalate J 3,3-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Benzo[b]fluoranthene R Benzo[b]fluoranthene R Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene J Benzo[a]pyrene J Lack Dinitrophenel R Pentachlorophenol J Pentachlorophenol J Butyl benzyl phthalate J	8OIL-0-9	Benzo[k]fluoranthene	R	7
Indeno[1,2,3-cd]pyrene R Benzo[g,h,i]perylene J 2,4-Dinitrophenol J Pentachlorophenol J Butyl benzyl phthalate J 3,3'-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R J R J Benzo[k]fluoranthene Benzo[k]fluoranthene R Benzo[k]fluoranthene R J Benzo[k]fluoranthene J J Benzo[k]fluoranthene J Benzo[k]fluoranthene J Benzo[k]henol J J J Benzo[k]henol J Butyl benzyl phthalate J	SOIL-0-9	Benzo[a]pyrene	R	T
Benzo[g,h,i]perylene J 2,4-Dinitrophenol J Pentachlorophenol J Butyl benzyl phthalate UJ Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Benzo[k]fluoranthene R Jahenzo[k,hi]perylene J Benzo[g,h,i]perylene J Pentachlorophenol J Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-9	Indeno[1,2,3-cd]pyrene	Я	Ī
2,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J 3,3'-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[a]pyrene J Indeno[1,2,3-cd]pyrene J Benzo[a,h,i]perylene J 2,4-Dinitrophenol J Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-9	Benzo[g,h,i]perylene	ſ	T
Pentachlorophenol J Butyl benzyl phthalate J 3,3'-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene J Benzo[g,h,i]perylene J 2,4-Dinitrophenol J Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	2,4-Dinitrophenol	R	T
Butyl benzyl phthalate J 3,3*-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene J Benzo[b,i]perylene J 2,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	Pentachlorophenol	f	Т
3,3-Dichlorobenzidine UJ Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[a]pyrene J Indeno[1,2,3-cd]pyrene J Benzo[a,i,i]perylene J 2,4-Dinitrophenol J Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	Butyl benzyl phthalate	ſ	Т
Bis (2-ethylhexyl) phthalate J Chrysene J Benzo[b]fluoranthene R Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene J Benzo[a,h,i]perylene J Z,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	3,3'-Dichlorobenzidine	m	T
Chrysene J Benzo[b]fluoranthene R Benzo[s]fluoranthene R Benzo[a]pyrene J Indeno[1,2,3-cd]pyrene J Benzo[g,h,i]perylene J 2,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	Bis (2-ethylhexyl) phthalate	ſ	T
Benzo[b]fluoranthene R Benzo[k]fluoranthene R Benzo[a]pyrene J Indeno[1,2,3-cd]pyrene J Benzo[g,h,i]perylene J 2,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	Chrysene	ſ	1
Benzo[k]fluoranthene R Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene J Benzo[g,h,i]perylene J 2,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	Benzo[b]fluoranthene	R	Ţ
Benzo[a]pyrene R Indeno[1,2,3-cd]pyrene J Benzo[g,h,i]perylene J 2,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	Benzo[k]fluoranthene	R	T
Indeno[1,2,3-cd]pyrene J Benzo[g,h,i]perylene J 2,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	Benzo[a]pyrene	R	T
Benzolg,h,i]perylene J 2,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	Indeno[1,2,3-cd]pyrene	ſ	Γ
2,4-Dinitrophenol R Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-10	Benzo[g,h,i]perylene	ſ	T
Pentachlorophenol J Butyl benzyl phthalate J	SOIL-0-8	2,4-Dinitrophenol	R	T
	SOIL-0-8	Pentachlorophenol	J	ı
	SOIL-0-8	Butyl benzyl phthalate	ſ	Τ

	Analyte	Qualification	Code
SOIL-0-8	3,3'-Dichlorobenzidine	m	7
SOIL-0-8	Bis (2-ethylhexyl) phthalate	ſ	Ţ
SOIL-0-8	Chrysene	ſ	Ţ
SOIL-0-8	Benzo[b]fluoranthene	ſ	Ţ
SOIL-0-8	Benzo[k]fluoranthene	R	Ţ
SOIL-0-8	Benzo[a]pyrene	ſ	T
SOIL-0-8	Indeno[1,2,3-cd]pyrene	ſ	T
SOIL-0-8	Benzo[g,h,i]perylene	R	7
IDW-SITES	2,4-Dinitrophenol	R	Ţ
IDW-SITES	Pentachlorophenol	ſſ	T
IDW-SITES	Butyl benzyl phthalate	R	Ţ
IDW-SITES	3,3'-Dichlorobenzidine	m	Ţ
IDW-SITES	Bis (2-ethylhexyl) phthalate	R	I
IDW-SITES	Chrysene	Я	T
IDW-SITES	Benzo[b]fluoranthene	R	7
IDW-SITES	Benzo[k]fluoranthene	R	1
IDW-SITES	Benzo[a]pyrene	R	ı
IDW-SITES	Indeno[1,2,3-cd]pyrene	R	7
IDW-SITES	Benzo[g,h,i]perylene	R	7
IDW-AT-Q-32	2,4-Dinitrophenol	R	T
IDW-AT-Q-32	Pentachlorophenol	UJ	1
DW-AT-Q-32	Butyl benzyl phthalate	ſ	Ţ
DW-AT-Q-32	3,3'-Dichlorobenzidine	UJ	L
IDW-AT-Q-32	Bis (2-ethylhexyl) phthalate	ſ	L
IDW-AT-Q-32	Chrysene	R	1
IDW-AT-Q-32	Benzo[b]fluoranthene	R	7
IDW-AT-Q-32	Benzo[k]fluoranthene	R	ı
IDW-AT-Q-32	Benzo[a]pyrene	R	L
IDW-AT-Q-32	Indeno[1,2,3-cd]pyrene	R	T
DW-AT-Q-32	Benzo[g,h,i]perylene	R	L
AT-Q-30-SB-6	2,4-Dinitrophenol	R	T
AT-Q-30-SB-6	Pentachlorophenol	UJ	T
AT-Q-30-SB-6	Butyl benzyl phthalate	R	7
AT-Q-30-SB-6	3,3'-Dichlorobenzidine	UJ	L

Qualification Code	e R L	I	l l	T	T	T	, i
Analyte	Bis (2-e	Chrysene	Benzo[b]fluoranthene	Benzo[k]fluoranthene	Benzo[a]pyrene	ıI	Benzola hilnemilene
Field ID	AT-Q-30-SB-6	AT-Q-30-SB-6	AT-Q-30-SB-6	AT-Q-30-SB-6	AT-Q-30-SB-6	AT-Q-30-SB-6	AT-05-05-A

10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal stand	lard area of every sample and b	lank within upper and lower	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	ſ	ſ			
	Non-detect	None	UI	R			
	The method speci	fication is for the continuing ca	dibration to be compared to	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibration. Thus, if	ttion. Thus, if all other QC spec	cifications are met for a give	all other QC specifications are met for a given sample, using informed professional			
	judgment, the revi	udgment, the reviewer may choose not to flag individual samples in this case.	dividual samples in this cas		-		
10.2	Are retention time	Are retention times of internal standards within 30 seconds of the associated calibration standard?	0 seconds of the associated	calibration standard?	X		
	Action: The chron magnitude, the rev	matogram must be examined to viewer may consider partial or 1	determine if any false posicotal rejection of the data for	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

11.0 TCL Identification (Code W)

		Yes	ž	Y Y
111	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
1111	continuing calibration?			×
		SEA COLUMN TO THE PROPERTY OF		
11.2	Are the three lons of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
7.1.7	do sample and standard relative ion intensities agree within 30%?			×

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		ıes	2	V
12.1	Are RLs used consistent with those specified in the QAPP?			X
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

13.0 Field Duplicate Samples (Code F)

		Yes	2	A V
13.1	Were any field duplicates submitted for SVOC analysis?		х	
13.2	Were all RPD or absolute difference values within the control limits?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	¥		
14.2	Number of samples: 6			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
-	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)			
	% Completeness			

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Bart Brandenburg 8/31/2005 Laboratory Reviewer: Date:

Severn Trent Laboratory - Savannah

Sauget - Area 2

Project Number: Project Name:

Review Level:

SDG No.:

21561511.60011 Level III SAS 023

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs:

IDW-SITES

IDW-AT-Q-32

1.0 Chain of Custody/Sample Condition

1.1 D.	Do Chain-of-Custody forms list all samples analyzed?	X	
1.2 Ar	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×	
13 De	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples		
an an	analytical problems or special circumstances affecting the quality of the data?	×	

The laboratory case narrative indicated that the LCS recovery was outside QC limits Note:

Although it is beyond the scope of this review it should be noted that the CCV and ICAL had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		-		
2.1	Do sample preservation, collection and storage condition meet method requirement?	×		
•	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
, ,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time	o		
7:7	Table for sample holding time) If yes, J(+)/UJ(-).	<u> </u>	×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		×	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Ves	ž	V
3.1	Is a Method Blank Summary form present for each batch?	Х		
3.2	Do any method blanks have positive results (TCL)?		X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL			
	for estimate (laboratory "J" flagged) concentrations.	•		
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			•
				_

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	ŝ	¥Z
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			×
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

		r es	x es	Y Z
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
				!
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			>
	,			<
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
	149			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

	The state of the s	I es	res No NA	NA NA
6.1	6.1 Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $< 15\%$)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R			
6.4	6.4 If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

				-	Yes	No	NA
7.1	Are all sample	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Surrogate Recovery Summ	ary Form?	X		
7.2	Are surrogate	Are surrogate recoveries within acceptant	acceptance criteria specified in the QAPP for all samples?	APP for all samples?	X		
7.3	If No in Section	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	s) or method blank(s) reana	lyzed?			×
7.4	If No in Section	If No in Section 7.3, is any sample dilution	on factor greater than 10?	ple dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
		> NCT	10% to LCL	<10%			
·	Positive	ſ	ſ	ſ			
· 73	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

	- The state of the	x es	res No NA	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

9.1 Is an LCS recovery form present? 9.2 Is an LCS analyzed at the required frequency of one per twer 9.3 Are all LCS %Rs and RPDs within acceptance criteria specif 9.4 If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria				
9.2 Is an LCS analyzed at the required freque 9.3 Are all LCS %Rs and RPDs within accep 9.4 If Level IV, verify the % recoveries are c Action for specific compound outside the	int?	X		
9.3 Are all LCS %Rs and RPDs within accep 9.4 If Level IV, verify the % recoveries are c Action for specific compound outside the	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	Х		
9.4 If Level IV, verify the % recoveries are c Action for specific compound outside the	ithin acceptance criteria specified in the QAPP?		×	
Action for specific commonned outside the	eries are calculated correctly.			×
J(+) only; <lcl, <10%="" a<="" j(+)="" td="" uj(-);=""><td>Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flaeged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,></td></lcl,>	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flaeged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

S. 39	1	_	Ī
LCS Limits	30-130	40-140	
LCS Recoveries	29	37	
Analyte	Monochlorobiphenyl	Tetrachlorobiphenyl	
TCSID	LCS 680-12541	LCS 680-12541	

Field ID	Analyte	Qualification	Code
IDW-SITES	Monochlorobiphenyl	ſ	Ţ
IDW-SITES	Tetrachlorobiphenyl	f	T
IDW-AT-Q-32	Monochlorobiphenyl	UJ	J
IDW-AT-Q-32	Tetrachlorobiphenyl	J	Т

10.0 TCL Identification (Code W)

		23.	7.10	117	-
10.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing				_
10.1	calibration?			×	_

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	ž	Y Y
11.1	Are RLs used consistent with those specified in the QAPP?			×
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
110	A	AC. A		
5.11	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

12.0 Field Duplicate Samples (Code F)

		ı es	0	Y Z
12.1	Were any field duplicates submitted for analysis?		×	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

		_	Yes	No NA	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	6 for soil			
1.0.1	sample)		×		
13.2	Number of samples:				
13.3	Number of target compounds in each analysis:				
13.4	Number of results rejected and not reported:				
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness 100				

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Bart Brandenburg 8/31/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah Laboratory

21561510.60010 Sauget - Area 2 Level III SAS 023

Project Number: Project Name:

Review Level:

SDG No.:

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS and MS/MSD recoveries.

IDW-SITES SOIL-0-9 Field IDs:

IDW-AT-Q-32 SOIL-0-10

AT-Q-30-SB-6 SOIL-0-8

1.0 Chain of Custody/Sample Condition

		ICS	NO ON	N.
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
	analytical problems or special circumstances affecting the quality of the data?	×		
		8		

The laboratory case narrative indicated the LCS and MS/MSD had recoveries outside the QC limits. Note:

2.0 Holding Time/ Preservation (Code H)

		Yes	No No	Ą Z
2.1	Do sample preservation, collection and storage condition meet method requirement?	×		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	$(> 10^{\circ} C)$, then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
	Table for sample holding time) If yes, J(+)/UJ(-).	888.10	×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		•	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	°Z	₹ Z
3.1	Is a Method Blank Summary form present for each batch?	×		
3.2	Do any method blanks have positive results?		Х	
3.3	Do any field/rinse/equipment blanks have positive results?		×	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
:	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	- 1/4/19/6		
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code C)

		S	WI ONI CAL	Į.
5.1	Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 12 hours?			· >
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			* *
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	5.4 If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

6.0 Surrogate Recovery (Code S)

					Yes	No NA	Y.
6.1	Are all sample	es listed on the appropriate S	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	orm?	X		
6.2	Are surrogate	recoveries within acceptanc	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	for all samples?	X		
6.3	If No in Section	on 6.2, were these sample(s)	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?	Ġ.			×
6.4	If No in Section	on 6.3, is any sample dilutio	n factor greater than 10? (Surro	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> UCL	10% to LCL	<10%			
	Positive	J	ſ				
	Non-detect None	None	U	R			
				3	-	-	

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Kes	Yes No NA	₹ Z
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	×		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each	,		
	matrix?	đ		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other OC	200 March 1971		
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			
Note:	The MS/MSD sample AT-Q-30-SB-6 had several recoveries outside QC limits. Oualifications are listed below.			

The MS/MSD sample AT-Q-30-SB-6 had several recoveries outside QC limits. Qualifications are listed below.

71-109	-26 / -38	Pentachlorophenol	AT-Q-30-SB-6
MS/MSD Limits	MS/MSD Recoveries	Analyte	Field ID

Sp. ***	_
Code	M
Qualification	J
Analyte	Pentachlorophenol
Field ID	AT-Q-30-SB-6

8.0 Laboratory Control Sample (LCS/LCSD) (Code I - LCS recovery Code e - RPD)

		ទ	WI ON	
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	×		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,		Ī	
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

LCS/LCSD Limits	71-109
LCS/LCSD Recoveries	63 / 75
Analyte	Pentachlorophenol
GI SƏT	LCS 680-12546

Field ID	Analyte	Qualification	Code
SOIT-0-9	Pentachlorophenol	ſ	T
SOIL-0-10	Pentachlorophenol	1	1
SOIT-0-8	Pentachlorophenol	ſ	J
IDW-SITES	Pentachlorophenol	ſ	Γ
IDW-AT-Q-32	Pentachlorophenol	ſ	1
AT-Q-30-SB-6*	Pentachlorophenol		T

9.0 TCL Identification (Code W)

	1	ICS	INO	IA
-0	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
7.1	calibration?		-	×

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
10.1	Are RLs used consistent with those specified in the QAPP?			×
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			*
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			1

Note:

11.0 Field Duplicate Samples (Code F)

		ICS	ONI	NA
11.1	Were any field duplicates submitted for herbicide analysis?		×	
11.2	Were all RPD or absolute difference values within the control limits outlined in the OAPP?		*	
			•	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

12.0 Data Completeness

		Yes	Š	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	X		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)			
	% Completeness 100	3		

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

21561510.60011 Sauget - Area 2 SAS 023 Project Number: Project Name: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 8/31/2005 Laboratory Reviewer: Date:

Level III

Review Level:

Major Anomalies:

No samples were rejected

Minor Anomalies:

Field IDs:

Samples were qualified based on MS/MSD recoveries and method blank contamination.

SOIL-0-9
SOIL-0-10
SOIL-0-8
IDW-SITES
IDW-AT-Q-32

AT-Q-30-SB-6

1.0 Chain of Custody/Sample Condition/Raw Data

CVAA-Hg

GFAA

ICP-MS

ICP

)
		Yes	No N	Yes No NA Yes No NA Yes No NA Yes No NA	N N	A Yes	No	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	×							×	\vdash	Π
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×							×		
	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample	e	Oscaria Carolina							.28 .28	Ī
1.3	receipt, condition of samples, analytical problems or special circumstances affecting the quality x	×							×		
	of the data?								<u> </u>		
1	Does sample preservation, collection and storage meet method requirement? (water samples:	S:									
+	with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	×						7.0	×		
	Are the digestion logs present and complete with pH values, sample weights, dilutions, final	TE						30000		t	
1.5	volume,. % solids (for soil samples), and preparation dates? For any missing or incomplete x	×							×		
	documentation, contact the laboratory for explanation/resubmittal.							2002			

The laboratory case narrative indicated that the MS/MSD samples had recoveries outside QC limits Note:

The narrative also indicated that the method blank had detections above the MDL, and holding times outside criteria.

2.0 Holding Time (Code H)

		s)	No NA	Yes	No NA Yes		/N ON	NA Yes	ž	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been									
i	exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		×					×		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)					P. 35		_		
	J(+)/R(-)									

CVAA-Hg

GFAA

ICP

Samples were analyzed outside QC limit holding times. Qualifications are listed below. Note:

		Т-	_	$\overline{}$	+ -	
Code	H	Н	Н	Н	Н	H
Qualification	ſ	J	ſ	J	J	J
Days Late	9	9	9	9	9	9
Analyte	Mercury	Mercury	Mercury	Mercury	Mercury	Mercury
Field ID	SOIL-0-9	SOIL-0-10	SOIT-0-8	IDW-SITES	IDW-AT-Q-32	AT-Q-30-SB-6

3.0 Instrument Calibration (Code C)

ICP—MS GFAA CVAA- Sluded in the calibration curve? (ICP/ICP-MS: blank + one standard; ards; CVAA: blank + five standards) ents > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). erification (ICV) analyzed at the beginning of each analysis? Action: ment to determine affect on the data and note in reviewer narrative. I verification (CCV) performed every 10 analysis or every 2 hours, arrative. I Action: If no, use professional judgment to determine affect on the arrative. Id percent recoveries (ICV and CCV) within the control limits? I Action: J(+)/UJ(-) J(+)/UJ(-) J(+) R(+) R(+) J(+)/UJ(-) J(+)/	lg.	NA		×	×	×	×			
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Action: R(++) J(+)/UJ(-) J(+) R(+) R(+) R(+) S(5% - 79% 121% - 135% > 135% > 135%	AA-I	å								
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Action: Mercury (80%-120%) and other Metals (90%-110%). Action: Action: Action: Are sufficient years and a light of the property of the prop	CV									
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Action: Mercury (80%-120%) and other Metals (90%-110%). Action: Action: Action: Are sufficient years and a light of the property of the prop	Ą	NA					<u> </u>	_		
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Action: R(+/-) J(+)/UJ(-) J(+) R(+) R(+) R(+) R(+) J(+)/UJ(-) J(+) R(+) R(+) R(+) J(+)/UJ(-) J(+)/UJ(-) J(+)/UJ(-) J(+)/UJ(-) J(+)/UJ(-) J(+)/UJ(-) J(+)/UJ(-) J(+)/UJ(-) J(-)/UJ(-)	GFA	-	1980 - 1881 - 18	F-5-14-38			Part of the second		186, 167	
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Action: R(+/-) J(+)/UJ(-) J(+) R(+) R(+) R(+) J(+)/UJ(-) J(+) R(+) R(+) R(+) J(+)/UJ(-) J(-)/UJ(-) J(-)/		Yes								
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Action: R(+/-) J(+)/UJ(-) J(+) R(+) R(+) R(+) J(+)/UJ(-) J(+) R(+) R(+) R(+) J(+)/UJ(-) J(-)/UJ(-) J(-)/	4S	NA					<u> </u>			
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action. J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%). Action: R(+/-) J(+)/UJ(-) J(+) R(+) R(+) R(+) R(+) R(+) R(+) R(+) J(+)/UJ(-) J(+) R(+) R(+) R(+) R(+) R(+) R(+) R(+) R	CP-N					1000 10 . 8%	980278 V.C		200	
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%). Action: R(+/-) J(+)/UJ(-) J(+) R(+) R(+) Mercury < 65% 65% 65% - 79% 121% - 135% > 135%		Yes								
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%). Action: R(+/-) J(+)/UJ(-) J(+) R(+) R(+) Mercury < 65% 65% 65% - 79% 121% - 135% > 135%		NA	×		х	×	×			
Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards) Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-). Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative. Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%). Action: R(+/-) J(+)/UJ(-) J(+) R(+) R(+) R(+) R(+) R(+) R(+) R(+) R	ICP				700000000000000000000000000000000000000				- CO. Sec.	
		Yes								
3.3 3.3 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5			Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)		Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	R(+/-) $J(+)/UJ(-)$ $J(+)$	< 65% 65% - 79%	Other Metals <75% 75%-89% 111%-125% > 125%
			3.1	3.2	3.3	3.4	3.5			

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

									ſ
		ΣI	ICP	ICP-MS	MS	GFAA	CY 	CVAA-Hg	
		Yes N	No NA Yes		No NA Yes	No NA Yes		N N	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	×					×		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	×			\$ 1. WY			*	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	X					и	200	
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	X	157 F 1 27				Ж		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	×						X	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		×		90000			×	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).							×	

Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required. Note:

CVAA-Hg

GFAA

ICP-MS

ICP

5.0 ICP Interference Check Sample (ICS) (Code N)

)
							Yes	N _o N	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	°Z	NA Ye	S	NA	Yes	No	NA
5 1	Was ICS A	B analyzed at	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the	CP run (or a	t least twice every	8 hours), and at the		\vdash			-	-	L		T	Τ
٦.٠٢	beginning o	or once every 8	beginning or once every 8 hours (whichever is	s more frequ	more frequent) for ICP-MS?	ί.)	780	_					
5.2	Are the ICS	AB recoverie	Are the ICS AB recoveries within 80% - 120%?	.%				f			\vdash					
5.3	Are the resu	ılts for unspik	Are the results for unspiked analytes (in ICS A) < + IDL?	4) < + IDL?	!			 ^								
5.4	If not, are th	ne associated s	If not, are the associated sample Al, Ca, Fe, an	nd Mg concer	ntrations less than	d Mg concentrations less than the level in the ICS?				9 Ly. p. 90			ļ			
	Action:	Not Spike	Not Spiked Analytes	Spiked	Spiked analytes (ICS AB analytes)	analytes)		+			-	+				
		<-IDL	> IDL	< 50%	50% - 79%	> 120%		-				-			┢	
		(-)rn	J(+)	R(+/-)	J(+)/UJ(-)	J(+)		-								

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

6.1 Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results. 6.2 Sb, Solid limits: as per EPA-EMSL/LV) Action: Solid CLCL > UCL > UCL > UCL > UCL > U(+) I(+) I(+) I(+) I(+) I(+) I(+) I(+) I						ICP	<u> </u>	ICP-MS		GFAA	_	CVAA-Hg	-Hg
		20.00			Yes	No NA	Yes	No	NA Yes	No	NA Ye	s No	NA
	6.1	Was an LCS prepared and analyzed at the correct freque matrix and per level)? Action: If no, J(+) any sample π	ency (one per 20 sate associated with I	amples, per batch, per CS results.	×							الداد	
Aqueous < 50% 50% - 79% R(+/-) J(+)/UJ(-)	6.2	Is any LCS recovery outside the control limits? (Aquer Sb; Solid limits: as per EPA-EMSL/LV)	ous limits: 80% - 1	20% - except Ag and		×			92			×	
> UCL < 50% 50% - 79% J(+) R(+/-) J(+)/UJ(-)		Action: Solid	Aqueous						1		+		
J(+) $R(+/-)$ $J(+)/UJ(-)$			50% - 79%	> 120%								 	
		J(+)	J(+)/UJ(-)	J(+)									

Note

7.0 Laboratory Duplicates (Code K)

		Yes	No N.	A Yes	No N	Yes No NA Yes No NA Yes No NA Yes No NA	ů	NA Y	res D	7 9	Ϋ́
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	X	!	•					×		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		×							*	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for aqueous, and RPD < 35% or difference < \pm 2 X PQL for solids) Action: If no, J(+).	×							×		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.										Ī

CVAA-Hg

ICP-MS

ICP

Note: All RPD's were within criteria, sample AT-Q-30-SB-6 was used as the duplicate sample.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

						ICP)I	ICP-MS		GFAA		CVAA-Hg	Hg
					Yes	No NA Yes		No NA Yes	A Yes		No NA Yes	No	NA
	Was a spiked	Was a spiked sample prepared and analyzed	analyzed at the correct frec	at the correct frequency (one per 20 samples, per						7.2			
8.1	batch, per mat	rix and per level)? A	Action: If no, J(+), with pro	batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	×			_			×		
	associated with	associated with matrix spike results.											
83	Was a field bla	Was a field blank used for the MS analysis?		Action: If yes, J(+) with professional judgment.	0000.2								
7:0	Note in worksheet.	neet.			***	×						×	
	Note: Matrix	spike analysis may b	be performed on a field bla	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous					_		į		
	sample in an SDG.	DG.			-2044								
	For all analyte	For all analytes with sample concentration <	tration < 4 x spike concentra	4 x spike concentration, are spike recoveries within									
8.3	the control lin	the control limit of 75-125%? (No control	control limit applies to an	limit applies to analytes with concentration $> 4 x$		×				ile .	<u> </u>		
	spike concentration.)	ation.)			¥0					. 8552			
		%R > 125%	30% < %R < 74%	%R < 30%		_							
	Positive	J	ſ	ſ									
	Non-detect	None	UJ	R								1928	

Note: Sample AT-Q-30-SB-6 was spiked and analyzed. Qualifications are listed below.

AT-O-30-SB-6	Analyte	MS/MSD recoveries	MS/MSD Limits
2	Antimony	57 / 60	75-125
AT-Q-30-SB-6	Copper	164 / 120	75-125
AT-Q-30-SB-6	Potassium	135 / 84	75-125
AT-Q-30-SB-6	Zinc	72 / 89	75-125

Code	M	×	M	M
Qualification	l l	ſ	ſ	J
Analyte	Antimony	Copper	Potassium	Zinc
Field ID	AT-Q-30-SB-6	AT-Q-30-SB-6	AT-Q-30-SB-6	AT-Q-30-SB-6

9.0 Instrument Detection Limits (IDL)

	ICP		ICP-MS	S	GFAA	_	VAA-Hg	Hg
Yes	oN :	NA Y	es No	NA Ye	s No 1	NA Yes	No	NA
Are all IDL equal to or less than the reporting limits specified?		×						×

9.1 Note:

10.0 ICP Serial Dilutions (Code S)

			ICP		ICP-MS	MS		GFAA		CVAA-Hg	A-Hg	g
		Yes	No N	Yes No NA Yes No NA Yes No NA Yes No NA	Ž ș	o NA	Yes	N _o	NA 1	es N	[] or	NA
10.1	Were serial dilutions performed?	×									_	
10.2	10.2 Was a five-fold dilution performed?	X				_			<u> </u>		-	
10.3	Did the serial dilution results agree within 10% for analyte concentration $> 50 \times 10^{-50}$ in the original sample? If no, J(+).	×										

Samples AT-Q-30-SB-6 and SOIL-0-9 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

			ICF	11	ICF-IMS		GFAA		CVAA-HB	Цg	
		Yes	No NA	Yes	No	No NA Yes No NA Yes	No	No NA Yes	No	ŇĀ	
11.1	Were any field duplicates submitted for metal analysis?		×						×		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2$ x PQL and for solids, RPD $< 100\%$ or difference $< + 4$ x PQL)	-	×							×	

Note:

12.0 Result Verification (Code Q)

										•	
		Yes N	N of	4 Yes	No N	Yes	%	NA 3	(es)	_ چ	AA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?		×					1588	110		×
		7 7000	1			×	8	***	200000000000000000000000000000000000000		
12.2	Were all dilution reflected in the positive results and detection limits?		×				200020.7				×
						986780000		*			

CVAA-Hg

GFAA

ICP-MS

ICP

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for				
1.61	aqueous sample, 90% for soil sample)				
13.2	13.2 Number of samples:	9	0	0	9
13.3	13.3 Number of target compounds in each analysis:	22	0	0	_
13.4	Number of results rejected and not reported:	0	0	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100	####	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Severn Trent Laboratory - Savannah Bart Brandenburg 8/31/2005 Ammonia 350.1 Method No.: Test Name: Laboratory Reviewer: Date:

Sauget - Area 2

21561510.60011 SAS 023 Level III

Project Number: Project Name:

Review Level:

SDG No.:

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on MS/MSD recoveries

IDW-SITES SOIT-0-9 Field IDs:

IDW-AT-Q-32 SOIL-0-10

AT-Q-30-SB-6 SOIL-0-8

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			
5.1	samples, analytical problems or special circumstances affecting the quality of the data?	×		

The laboratory case narrative indicated that the MS/MSD had recoveries outside QC limits. Note:

Time/ Preservation (Do sample preservation (Ш
Do sample preservation, collection and storage condition meet method requirement? If samples were not on ice or the ice was melted mon arrival at the laboration, and the toward the toward the condition of the condition.	2.0 Holding	me/ Preservation (Code	Yes	S _o	
Do sample preservation, collection and storage condition meet method requirement? If samples were not on itse or the itse was melted mon arrival at the laboratory and the townsametries of the conditions.					
f samples were not on ice or the ice was melted mon arrival at the Jahanasan, and the tomasantum of the acceptance	2.1	to sample preservation, collection and storage con	×		
		f samples were not on ice or the ice was melted mon arrival at the Jahanasan, and the tomasantum of the acceptance	9		_

Ϋ́

	Control of the contro		
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".		
٠, ٢	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding		
7:-7	Time Table for sample holding time) If yes, J(+)/UJ(-).	×	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	*	
		2077 THE GOOD CONTRACT X-1-X-2	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		×	
3.3	Do any field/rinse/equipment blanks have positive results?		×	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		22.1	Z.
4.1	Are Initial Calibration summary forms present and complete for each instrument used?		×
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?		×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.		

Note:

5.0 Continuing Calibration (Code R)

		Yes	N _o	NA
5.1	Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 10 samples?			×
5.3	Do any analytes have a %R outside QC limits (80-120%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		S	WI ON	W
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	Х		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	×		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

The MS/MSD sample AT-Q-30-SB-6 had recoveries outside QC limits. Qualifications are listed below. Note:

	<u> </u>
MS/MSD Limits	75-125
MS/MSD Recoveries	42 / 44
Analyte	Ammonia
Field ID	AT-Q-30-SB-6

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		ន	TES ON ON	W
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	×		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	y(+) = 0.000, $ y(-) = 0.000$, $ y(-) = 0.000$, $ y(-) = 0.000$, $ y(-) = 0.000$			

Note:

8.0 Analyte Identification

8.1 Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?		1	1 63	7.0	VII	_
the continuing calibration?	- 0	T) of each reported compound (if applicable) within 0.06 RRT units of the standard RR				_
	6.1	the continuing calibration?			×	_

9.0 Analyte Quantitation and Reported Detection limits

		S	2	NA.
9.1	Are RLs used consistent with those specified in the QAPP?			×
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			
Note:		-		

10.0 Field Duplicate Samples (Code F)

		x es	0	A V
10.1	Were any field duplicates submitted?		×	
10.2	Were all RPD or shealthe difference values within the control limits and in the OADDO			
7:01	is to or absolute utilisistice values within the control lilling			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

11.0 Laboratory Duplicates (Code K)

		Yes	S No	N A
=======================================	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and			
	per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		×	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			*
	Are all analyte duplicate results within control? (RPD values < 20% or difference < + POI for accuse and RPD < 35% or	2		
11.3	difference < ± 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results			;
	are > 5 X IDL.			<

Note:

12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample. 90% for soil	lio		
1.2.1	sample)	X		
12.2	Number of samples:			
12.3	12.3 Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:		i	
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness 100	-		

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Bart Brandenburg 10/5/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah

Laboratory

Project Number: Project Name:

21561510.60011 Sauget - Area 2

SAS 024 Level III

Review Level:

SDG No.:

Minor Anomalies:

No samples were rejected

Major Anomalies:

No analytes required qualification, based on this data review.

AT-Q-22-SB-6-FB Field IDs:

TB-26 TB-24

AT-Q-30-SS-1FB

TB-A-7

TB-27

TB-25

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
Do Chain-of-Custody forms list all samples analyzed?		X		
Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	ıs maintained?	Χ		
Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	ms with sample receipt, condition of samples,		X	
				O CONTRACTOR CONTRACTO

2.0 Holding Time/ Preservation (Code H)

					1.03	TAC T	WI
2.1	Do sample preservati	Do sample preservation, collection and storag	ge condition meet method requirement?	hod requirement?	X		
	If sample preservation	on and/or temperature wa	s inappropriate (i.e.,	f sample preservation and/or temperature was inappropriate (i.e., <2°>6°C, etc.), comment in report. If unpreserved or			
	temperature is outside	le the range 0° (but not fi	rozen) to 10° flag all	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds	temperature exceeds 10°, flag positive detections "J" and non-detects "R".	ions "J" and non-deted	tts "R".			
2.2	Have any technical h	olding times, determined	d from sampling to da	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).	9,000	X	
	Matrix	Preserved	Aromatic	All others			
~	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical h	olding times been gross	ly (twice the holding t	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).	3000,000	X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		53 1	-	WI
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			x
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			×
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			×

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	S.	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		×	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2- hittanone) the plank concentration should be an unlifted "II" The result should be absorbed to the DI for action of all other concentrations should be a leavested to the DI for action of all others.			
	"J" flagged) concentrations.			·
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			×
				:

5.0 GC/MS Initial Calibration (Code C)

		S	0	M
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, $J(+)/R(-)$.			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			x
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.		-	:

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $<$ 20%)?			×
	If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For $\%D > 50\%$, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

7.0 Surrogate Recovery (Code S)

					I es	20	NA
7.1	Are all sample	es listed on the appropri	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Form?	χ		
7.2	Are surrogate	Are surrogate recoveries within acceptance of	otance criteria specified in the QAPP for all samples?	PP for all samples?	X		
7.3	If No in Secti	on 7.2, were these samp	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	¿pa			х
7.4	If No in Secti	If No in Section 7.3, is any sample dilution fi	lution factor greater than 10? (Su	actor greater than 10? (Surrogate recoveries may be diluted out.)			×
	Note: If SMC	recoveries do not meet	acceptance criteria in samples ch	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	equired.					
		> UCL	10% to LCL	<10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		7		T I
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		-	×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
;	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		X es	x es No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td>•</td><td></td><td></td></lcl,>	•		

10.0 Internal Standards (Code I)

					- Accessor	
10.1 A	are internal standard	Are internal standard areas for every sample and blank within upper and lower QC limits?	nk within upper and lowe.	r QC limits?	Х	
		Area > +100%	Area < -50%	Area < -10%		
<u>"F</u>	Positive	J	ſ	ſ		
Ž	Non-detect	None	UJ	R		
IL)	he method specifica	ation is for the continuing calibr	ation to be compared to the	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to		
Note: co	ontinuing calibration	n. Thus, if all other QC specific	cations are met for a giver	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,		
th	ne reviewer may cho	he reviewer may choose not to flag individual samples in this case.	les in this case.			
10.2 A	are retention times o	Are retention times of internal standards within 30 seconds of the associated calibration standard?	econds of the associated c	alibration standard?	X	
A	ction: The chromat	togram must be examined to de	termine if any false positi	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large		
m	nagnitude, the reviev	wer may consider partial or tota	I rejection of the data for	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.		

Note:

11.0 TCL Identification (Code W)

		3	ONI	INA
	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			,
	calibration?			×
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
711.7	do sample and standard relative ion intensities agree within 30%?			×

Note:

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		20.1		TACK.
12.1	Are RLs used consistent with those specified in the QAPP?			×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			
			,	

13.0 Field Duplicate Samples (Code F)

		I es	0	NA N
13.1	Were any field duplicates submitted for VOC analysis?		×	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

			X es	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	ueous sample, 90% for soil	X		
14.2	Number of samples:	7			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION WORKSHEET

Severn Trent Laboratory - Savannah Bart Brandenburg 10/5/2005 Laboratory Reviewer: Date:

Project Number: Project Name: Review Level: SDG No.:

21561510.60011 SAS 024 Level III Sauget - Area 2

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG

Field IDs:

AT-Q-22-SB-6-FB

AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	¥		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

2.0 Holding Time/ Preservation (Code H)

		S	2	W
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10			
	^o C), then flag all positive results with a "J" and all non-detects "UJ".			
٠,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table	0)		
7:7	for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			Ì
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	. 2.000	X	
			THE PARTY OF THE P	

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	Š.	Ą Z
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?			х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		3	2	5
4.1	1.1 Is a Method Blank Summary form present for each batch?	χ		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the			
	detection limit elevated to the KL for estimate concentrations.		•	
4.4	1.4 If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		S		W INO
5.1	5.1 Are Initial Calibration summary forms present and complete for each instrument used?		İ	×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
6.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like			-
ر.ر	amines and phenols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.	010000000000000000000000000000000000000		

6.0 Continuing Calibration (Code C)

		Yes	Š	₹ Z
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits $(\%D < 20\%)$?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.	:		

Note:

7.0 Surrogate Recovery (Code S)

Yes No NA		-	X		X	X X	X X	X X	X X	X X
Yes	X		×	X			x sis is required and acids	x x x x x x x x x x x x x x x x x x x	x x x x x x x x x x x x x x x x x x x	x sis is required and acids
		method blanks?					Are more than one of either fraction outside the acceptance criteria? If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed? If Yes in Section 7.3, is any sample dilution factor greater than 10? Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.	hen no reanalysis is required a	hen no reanalysis is required a	hen no reanalysis is required a
C	n ;	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?					diluted samples, then no	diluted samples, then no	diluted samples, then no	diluted samples, then no
	y Summary Form	in the QAPP for a		riteria?	riteria? reanalyzed?	riteria? reanalyzed? an 10?	riteria? reanalyzed? an 10? the MS and/ or di	riteria? reanalyzed? an 10? the MS and/ or di	riteria? reanalyzed? an 10? the MS and/ or dilt.	rriteria? reanalyzed? an 10? the MS and/ or di <109
	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	e criteria specified		Are more than one of either fraction outside the acceptance criteria?	Are more than one of either fraction outside the acceptance criteria? If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	Are more than one of either fraction outside the acceptance criteria? If Yes in Section 7.3, are these sample(s) or method blank(s) reanaly If Yes in Section 7.3, is any sample dilution factor greater than 10?	de the acceptance or method blank(s) on factor greater th	de the acceptance or method blank(s) on factor greater that table recoveries in	ide the acceptance or method blank(s) ion factor greater the ptable recoveries in 10% to LCL	or method blank(s) on factor greater th table recoveries in 10% to LCL
	the appropriate S	within acceptance		ner fraction outsic	these sample(s) c	these sample(s) cony sample dilution	these sample(s) or ny sample dilutio display unaccept desert senarately	Are more than one of either fraction outsid If Yes in Section 7.3, are these sample(s) of If Yes in Section 7.3, is any sample dilutio Note: If SMC recoveries display unaccept and base/ neutrals are assessed separately.	these sample(s) or ny sample dilutio display unaccept essed separately.	these sample(s) or ny sample dilutio display unaccept essed separately.
	mples listed on	ate recoveries		than one of eith	than one of eith	than one of eith ection 7.3, are tection 7.3, is an	han one of eith lection 7.3, are t lection 7.3, is ar MC recoveries	than one of eith ection 7.3, are t ection 7.3, is ar MC recoveries neutrals are asse	than one of eith ection 7.3, are t ection 7.3, is ar MC recoveries neutrals are asse > UCL	han one of eith ection 7.3, are t ection 7.3, is ar MC recoveries heutrals are asse > UCL
	Are all sam	Are surroga		Are more th	Are more th	Are more th If Yes in Se If Yes in Se	Are more th If Yes in Se If Yes in Se Note: If SN and base/ne	Are more th If Yes in Se If Yes in Se If Yes in Se Note: If SN and base/ n	Are more th If Yes in Se If Yes in Se If Yes is Se Note: If SN and base/ ns	Are more th If Yes in Se If Yes in Se Note: If SN and base/ ne Positive
	7.1	7.2		7.3	7.3	7.3	7.3	7.3	7.3	7.3

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	N0	Y.
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	×		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?	X		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria			
	and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require rejection.			
	RPD failures may be flagged "J" (+ only)			

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

,			
9.1 Is an Li	9.1 Is an LCS recovery form present?	×	
9.2 Is LCS	Is LCS analyzed at the required frequency for each matrix?	×	
9.3 Are all	Are all LCS %Rs (and RPDs) within acceptance criteria?	X	
Action failures	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td></lcl,>		
9.4 If Leve	9.4 If Level IV, verify the % recoveries are calculated correctly.		

Note:

10.0 Internal Standards (Code I)

					Yes	Ŝ	Z V
10.1	Are internal standar	rd area of every sample and bl	ank within upper and lower	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	×		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	T.	ſ			
	Non-detect	None	U	R			
	The method specifi	cation is for the continuing ca	libration to be compared to	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibrati	ion. Thus, if all other QC spec	ifications are met for a giv	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the			
	reviewer may choo	eviewer may choose not to flag individual samples in this case.	es in this case.				
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	0 seconds of the associated	calibration standard?	X		
	Action: The chrom	tatogram must be examined to	determine if any false posi	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude			
	the reviewer may co	the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	n of the data for non-detect	s in that sample/fraction.			

Note:

11.0 TCL Identification (Code W)

		103	100	
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			×
		600 mm 2 mm 23		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do			
11.2	sample and standard relative ion intensities agree within 30%?			×

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

12.1 Are RLs used cor			
1 1 A	Are RLs used consistent with those specified in the QAPP?		×
12.2 Are these limits a	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
12.3 Are TIC ions grea	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?		×
12.4 Are any positives	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	20000	×
12.5 If Level IV, calcu	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

13.0 Field Duplicate Samples (Code F)

		2	2	47.
13.1	Were any field duplicates submitted for SVOC analysis?		X	
13.2	Were all RPD or absolute difference values within the control limits?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

14.0 Data Completeness

		X T	Yes	No No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	nple) x			
14.2	Number of samples:				
14.3	Number of target compounds in each analysis:		<u> </u>		
14.4	Number of results rejected and not reported:				
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness 100				

DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Bart Brandenburg 10/5/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah Laboratory

Project Number: Project Name:

Review Level:

SDG No.:

21561511.60011 Sauget - Area 2

SAS 024 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

AT-Q-22-SB-6-FB Field IDs:

AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition

	The state of the s	7		
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
13	analytical problems or special circumstances affecting the quality of the data?		×	

Note:

2.0 Holding Time/ Preservation (Code H)

		S	res No NA	¥
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding	i per l'a		
7:-7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No NA	Y Z
3.1	3.1 Is a Method Blank Summary form present for each batch?	×		
3.2	Do any method blanks have positive results (TCL)?		X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		Х	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	%	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			×
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			Х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

5.0 Initial Calibration (Code R)

)	1
5.1	Are Initial Calibration summary forms present and complete for each instrument used?		×
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument		×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.		

6.0 Continuing Calibration (Code C)

		x es	NO ON	V
6.1	6.1 Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			×
	If yes, a marginal increase in response $>20\%$ then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For $\%D > 50\%$, flag R.			
6.4	6.4 If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sample	s listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Form?	X		
7.2	Are surrogate	recoveries within acceptan	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	PP for all samples?	×		
7.3	If No in Sectic	on 7.2, were these sample(s	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	ed?			×
7.4	If No in Section	If No in Section 7.3, is any sample diluti	on factor greater than 10? (Su	lilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> UCL	10% to LCL	<10%			
	Positive	J	J	ſ			
	Non-detect None	None	Ú	R			

Note:

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		res		NO ON
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may	•		
	require rejection. RPD failures may be flagged "J" (+ only)			

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		3	
9.1	9.1 Is an LCS recovery form present?	×	
9.2	9.2 Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	χ	
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X	
9.4	If Level IV, verify the % recoveries are calculated correctly.		
	Action for specific compound outside the acceptance criteria: %R>UCL,		
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td></lcl,>		

Z

10.0 TCL Identification (Code W)

		1 60	2	5
	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
10.1	calibration?			×

Note:

11.0 TCL Quantitation and Reported Detection limits (Code P)

11.1 Are RLs used consistent with those specified in 11.2 Are these limits adjusted to reflect dilutions and	specified in the QAPP?		
11.2 Are these limits adjusted to reflect dilutions and	tions and/ or nercent solids as required?		X
			х
11.3 Are any positives reported that exceed the lines	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		x
11.4 If Level IV, calculate a sample of positive resul	ositive results to verify correct calculations		

Note:

12.0 Field Duplicate Samples (Code F)

12.1	Were any field duplicates submitted for analysis?	X	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		

13.0 Data Completeness

			res	INO	INA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	% for aqueous sample, 90% for soil	X		
13.2	Number of samples:	2			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				
	% Completeness	100			

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Project Number: Project Name: Bart Brandenburg 10/5/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah

Laboratory

Sauget - Area 2 21561510.60010 SAS 024 Level III

Review Level:

SDG No.:

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

Field IDs: AT-Q-22-SB-6-FB

AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition

		Y es	0 Z	Y V
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
1.3	analytical problems or special circumstances affecting the quality of the data?		¥	

Note

2.0 Holding Time/ Preservation (Code H)

		x es	res No NA	A
2.1	Do sample preservation, collection and storage condition meet method requirement?	Х		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	$(> 10^{\circ} C)$, then flag all positive results with a "J" and all non-detects "UJ".		-	
23	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
7	Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	1	•	İ
			ę	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	å	₹ Z
3.1	3.1 Is a Method Blank Summary form present for each batch?	*		
3.2	Do any method blanks have positive results?		×	
3.3	Do any field/rinse/equipment blanks have positive results?		: 2	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the		1	
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		Yes	ŝ	Z
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			*
4.7	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
				•
	If not, $J(+)/U(-)$. In extreme cases, the reviewer may flag non-detects "R".			
	, , , , , , , , , , , , , , , , , , ,			
4.3	It Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			
			-	

Note:

5.0 Continuing Calibration (Code C)

		Les	res No NA	A A
5.1	Are Continuing Calibration Summary forms present and complete?			*
5.2	Has a continuing calibration standard been analyzed every 12 hours?			()
				¥
53	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing			
?	calibration CF outside QC limits (%D < 20%)?			×
	If yes, a marginal increase in response $>20\%$ then $J(+)$ only; a decrease in response then $J(+)/J(J(-))$ For $\%D>50\%$ flag R			
	The state of the s			
5.4	5.4 If Level IV, calculate a sample of CFs and % The from each CF to verify correct coloniations			

6.0 Surrogate Recovery (Code S)

					res	<u>0</u>	Y
6.1	Are all sample	es listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	Form?	X		
6.2	Are surrogate	recoveries within acceptar	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	PP for all samples?	X		
6.3	If No in Secti	If No in Section 6.2, were these sample(s	(s) or method blank(s) reanalyzed?	ed?			×
6.4	If No in Section	on 6.3, is any sample diluti	ion factor greater than 10? (Su	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> ncr	10% to LCL	<10%			
	Positive	ſ	ſ				
	Non-detect None	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		1 63	,	
7.1 I	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		X	
7.2 h	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
		3 S. C. C. S. S. S. S. S. S. S. S. S. S. S. S. S.		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
1	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other OC			
<u>.</u>	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
ľ	require rejection. RPD failures may be flagged "J" (+ only)			

Note:

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	ž	∀ Z
8.1	Is an LCS recovery form present?	à	i	
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	*		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	! >		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" $(+)$ only)			

9.0 TCL Identification (Code W)

		res	02	₹ Z
0 1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
7.1	calibration?			×

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		res	20	NA.
10.1	Are RLs used consistent with those specified in the QAPP?			×
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
10.4	If Level IV, calculate a sample of positive results to verify correct calculations	B		

Note:

11.0 Field Duplicate Samples (Code F)

		Yes	ŝ	₹ Z
11.1	Were any field duplicates submitted for herbicide analysis?		×	
		C. S. C. C. C. C. C. C. C. C. C. C. C. C. C.		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
				;
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note

12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	X		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness 100			

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Bart Brandenburg Reviewer:

10/5/2005

Date:

Severn Trent Laboratory - Savannah Laboratory

Project Name:

21561510.60011 Sauget - Area 2 **SAS 024**

Level III

Review Level:

Project Number:

SDG No.:

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs:

AT-Q-22-SB-6-FB AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition/Raw Data

CVAA-Hg

GFAA

ICP-MS

ICP

											1
		Yes No NA Yes No NA Yes No NA Yes No NA	NA	Yes	No N	A Yes	No	NA	l sə l	No	ΝΑ
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	×	and court						×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	.					Rayerr		X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of	<u>, </u>			15 15					4	
	the data?	۲ -	M. 9-3	<u>. 25%: </u>						1	
1 1	Does sample preservation, collection and storage meet method requirement? (water samples: with	12.50									
+	Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C + 2^{\circ}C$)	<u>.</u>	****						×		
:	Are the digestion logs present and complete with pH values, sample weights, dilutions, final				\vdash		7.23			-	
1.5	volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete	×	. a garille						×		
	documentation, contact the laboratory for explanation/resultmittal		and the								

2.0 Holding Time (Code H)

ICP ICP-MS GFAA CVAA-Hg	Yes No NA Yes NA Yes No NA Yes No NA Yes No NA Yes No NA Yes Na Yes N	ed from date of collection to date of analysis, been	hs) See attached Holding Time Table.	ossly exceeded (twice the holding time criteria)	
		Have any technical holding times, determined from date of collection to date of analysis, been	exceeded? (Hg: 28days, other metals: 6 months) See attach	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)	17+1/B(-)

CVAA-Hg

Note:

3.0 Instrument Calibration (Code C)

						, 1	ICP		ICP-MS	_	GFAA	Α	CV	CVAA-Hg	<u>8</u>
						Yes	No.	No NA Yes		No NA Yes		No NA Yes		No	NA
2 1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard;	cluded in the	calibration curv	e? (ICP/ICP-MS:	blank + one standard;	1									
3.1	GFAA: blank + three standards; CVAA: blank + five standards)	ards; CVAA:	blank + five stan	dards)				<u> </u>							
3.2	Are the correlation coefficients > 0.995? (for GFAA and	ents > 0.995?	(for GFAA and (CVAA) Action: J(+)/UJ(-).	+)/UJ(-).										×
n	Was an initial calibration verification (ICV) analyzed at t	erification (IC	3V) analyzed at tł	ne beginning of eac	the beginning of each analysis? Action: If										
ر.ر - ا	no, use professional judgment to determine affect on the	ent to determi	ine affect on the d	data and note in reviewer narrative.	iewer narrative.			<u> </u>							×
	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours,	n verification	(CCV) perform	ed every 10 analy	ysis or every 2 hours,										
3.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on the	t? Action: In	f no, use professi	onal judgment to	determine affect on the			×							×
	data and note in reviewer narrative.	arrative.													
7	Are all calibration standard percent recoveries (ICV and	l percent reco	veries (ICV and	CCV) within the c	CCV) within the control limits? Mercury	,		1							
J. J	(80%-120%) and other Metals (90%-110%).	tals (90%-11C	1%).	-				<u> </u>							×
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)										
	Mercury	< 65%	65% - 79%	121% - 135% > 135%	> 135%				-						
	Other Metals	< 75%	75% - 89%	111% - 125% > 125%	> 125%										

			ICP		ICP-MS	.x	GFAA	A	CA	CVAA-Hg	50
		Yes	No N	NA Yes	°Z	No NA Yes		No NA Yes		°N N	NA A
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	×			ygich stade Fores				м		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		×							м	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	X			098000 vanary/ *****				и		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	¥			000/1/0000000				X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.		×							×	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		ж					XXXXXXXXX Cover		×	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, J(+)/UJ(-).		X							×	

N.

5.0 ICP Interference Check Sample (ICS) (Code N)

CVAA-Hg

GFAA

ICP-MS

ICP

							Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	<u> </u>	VA Yes	No	NA	Yes	N N	VA Ye	z g	NA C	
5.1	Was ICS A	B analyzed a	t beginning of each	ICP run (or	at least twice eve	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the									-		T
7.7	beginning o	r once every	beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	s more freque	int) for ICP-MS?				<u> </u>								
5.2	Are the ICS	AB recoverie	Are the ICS AB recoveries within 80% - 120%?	.62					×								
5.3	Are the resu	ılts for unspik	Are the results for unspiked analytes (in ICS A) < + IDL?	4) < + IDL?					×							<u> </u>	/
5.4	If not, are th	ne associated a	sample Al, Ca, Fe, a	nd Mg concer	ntrations less than	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?		<u> </u>	×								T
	Action:	Not Spike	Not Spiked Analytes	Spiked a	analytes (ICS AB analytes)	analytes)									_		
		<-IDF	>IDF	%05.>	50% - 79%	> 120%		-				_		<u> </u>			
		(-)fn	J(+)	R(+/-)	J(+)/(1)(-)	J(+)		\vdash					H	-			Т

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

CVAA-Hg

GFAA

ICP-MS

ICP

																0
							Yes	Z %	A Yes	Yes No NA Yes No NA Yes No NA Yes No NA	NA	⟨es]	VO NA	Yes	No	NA
6.1	Was an LC	Was an LCS prepared and analyzed at the correct frequ	1 analyzed at tl	he correct frequ	uency (one per 2	ency (one per 20 samples, per batch, per	 						_	()		
0.1	matrix and	matrix and per level)? Action: If no, J(+) any sample not	tion: If no, J(+)	any sample nc	ot associated with LCS results.	LCS results.	4							*		
6.7	Is any LCS	recovery outsic	de the control la	imits? (Aqueou	us limits: 80% -	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb;			_							
7.0	Solid limits	Solid limits: as per EPA-EMSL/LV)	MSL/LV)					×							×	
	Action:	Solid	lid		Aqueous											
·		< CCL > UCL	> NCL	< 50%	90% - 79%	> 120%										
		J(+)/(1)(-)	J(+)	R(+/-)	J(+)/(1)(-)	J(+)										

Not

7.0 Laboratory Duplicates (Code K)

		8 - S	A V	Xes	Yes No NA Yes No NA Yes No NA Yes No NA	4 Xes	ŝ	Y Z	L es	o N	NA A
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,								Ü	_	
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	×								×	
	associated with Duplicate results.										
7.7	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment.		3 10000								
7.1	Note in worksheet.		×						<u> </u>	100	×
7.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for									ļ	
C./	aqueous, and RPD < 35% or difference $< \pm 2$ X PQL for solids) Action: If no, J(+).		×				SW is				×
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.						- 3			<u> </u>	
							280			1	

CVAA-Hg

ICP-MS

ICP

20	NA		×		×			
CVAA-Hg	No	×				-		
CA,								
	VA Y							8
GFAA	No NA Yes							
Ð								
	NA Y							
ICP-MS	No NA Yes							
2								
	No NA Yes		×		×			
ICP	No	×						
	Yes							
		s, per	Note	mple	in the spike			82 300,73
		Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)	%R > 125% 30% < %R < 74% %R < 30%	Positive J J	Non-detect None UJ R
٠		8.1 b	8.2 u	Y ii	8.3 c		14	<u>~</u>

Note:

9.0 Instrument Detection Limits (IDL)

ı			ш
)	NA	×	
	No		
	Yes		
	NA N		
	No		
	Yes		
	NA	V 788	
	No		
	Yes		
	NA	×	
I	No	200000200 /	
	Yes		
		9.1 Are all IDL equal to or less than the reporting limits specified?	NI-4

CVAA-Hg

GFAA

ICP-MS

ICP

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

10.0 ICP Serial Dilutions (Code S)

		-	-		-			l			
		× ×	Ž	Yes No NA Yes	No NA Yes No NA Yes	A Ye	S N	N O	Yes	%	NA
10.1	Were serial dilutions performed?	×	_		\vdash	┝	-	-			
		SACOREC.		AC EVENOMB.							ĺ
10.2	Was a five-fold dilution performed?		X			_					
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the	65, 7 65, 1 8, 8									
10.3	original sample? If no, J(+).		<u>×</u>								

Note:

8/7/2006

			ICP		ICP-MS	MS)	GFAA		CV.	CVAA-Hg	g _f
		Yes	No	No NA Yes		No NA Yes	Yes	No NA Yes	NA	(es	9 N	NA
1.1	Were any field duplicates submitted for metal analysis?		×								×	
1.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < + 2 x POL and for solids. RPD < 100% or difference < + 4 x POL.)	1		×		ļ						×

Note:

12.0 Result Verification (Code Q)

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous					_
1.0.1	sample, 90% for soil sample)					
13.2	Number of samples:	2	0	Ī	0	2
13.3	Number of target compounds in each analysis:	22	0	<u> </u>	0	
13.4	Number of results rejected and not reported:	0	0	T	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$	Ī		1		
	% Completeness	001	###	1#	####	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:Bart BrandenburgDate:10/5/2005LaboratorySevern Trent Laboratory - SavannahTest Name:AmmoniaMethod No.:350.1

Sauget - Area 2 21561510.60011 SAS 024 Level III

Project Name: Project Number:

Review Level:

SDG No.:

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs: AT-Q-22-SB-6-FB

AT-Q-30-SS-1-FB

1.0 Chain of Custody/Sample Condition

1.1 Do Chain-of-Custody forms list all samples analyzed? 1.2 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained? 2.3 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?			2	21.1	4 71.7
ly facha	1.1		X		
orts, cha problen	1.2	ly fo	X		u.
	1.3	orts, cha problen		X	

Note:

2.0 Holding Time/ Preservation (Code H)

		I CS	ICS NO INA	INA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 $^{\circ}$ C), then flag all positive results with a "J" and all non-detects "UJ".			
,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		×	
			SECRETARIO SECURITARIO DE CONTRA DE	

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		x es	0 Z	ď.
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?	3.88	X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			
		1		

Note:

4.0 Initial Calibration (Code C)

		S	2	M
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

5.0 Continuing Calibration (Code R)

		r es	res No NA	Z.
5.1	Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 10 samples?			×
5.3	Do any analytes have a %R outside QC limits (80-120%)?	Jac 9. 1985		×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

			!!!
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	×	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		×
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC		
	criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may		
	require rejection. RPD failures may be flagged "J" (+ only)		

Note

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

7.1 Is an LCS recovery form present? 7.2 Is an LCS analyzed at the requirec 7.3 Are all LCS %Rs and RPDs within	Is an LCS recovery form present? Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X	
7.2 Is an LCS analyzed at the 17.3 Are all LCS %Rs and RPD	ne required frequency of one per twenty field samples for each matrix?	X	
7.3 Are all LCS %Rs and RPD			
	Are all LCS %ks and RPDs within acceptance criteria specified in the QAPP?	×	
7.4 If Level IV, verify the % r	If Level IV, verify the % recoveries are calculated correctly.		
Action for specific compor	Action for specific compound outside the acceptance criteria: %R>UCL,		
J(+) only; <lcl, j(+)="" td="" uj(-);<=""><td>$J(\cdot)$; <10% $J(+)/R(\cdot)$. RPD failures should be flagged "J" (+ only)</td><td></td><td></td></lcl,>	$J(\cdot)$; <10% $J(+)/R(\cdot)$. RPD failures should be flagged "J" (+ only)		

Note:

8.0 Analyte Identification

		Yes	No	NA	
8.1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in the continuing calibration?			×	

Note:

9.0 Analyte Quantitation and Reported Detection limits

		2000 CONTRACTOR OF THE PARTY OF	
7.7	Are KLs used consistent with those specified in the QAPP?		×
			!
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
		2002/32: · · · · · · ·	
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
		OR SPEAN CAP COMMISSION COMMISSIO	
9.4	If Level IV, calculate a sample of positive results to verify correct calculations		

10.0 Field Duplicate Samples (Code F)

		S	2	V.	
10.1	Were any field duplicates submitted?		×		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			х	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.				

Ž

11.0 Laboratory Duplicates (Code K)

		Yes	Yes No NA	Y Z
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		×	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		11	×
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \(\preceq \) PQL for aqueous, and RPD < 35% or difference < \(\preceq \) 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			×

Note:

12.0 Data Completeness

		Yes	Š,	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	*		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness 100			

N.

	•	
·		

DATA VALIDATION WORKSHEET **VOLATILE ORGANIC ANALYSIS**

Bart Brandenburg Reviewer:

9/7/2005

Severn Trent Laboratory - Savannah

Laboratory

Date:

No samples were rejected

Major Anomalies:

Minor Anomalies:

Project Number: Project Name:

21561510.60011 Sauget - Area 2 Level III **SAS 025**

SDG No.:

Review Level:

Samples were qualified based on LCS, surrogate, and internal standard recoveries, and due to method blank detections.

AT-Q-22-SB-6 AT-Q-30-SS-1

Field IDs:

AT-P-5-WS-12

AT-Q-30-SS-1-D AT-Q-19-SS-1.5

AT-Q-22-SS-0.5

AT-P-3-SS-0.5 AT-Q-29-SS-1

AT-P-50-SB-6

AT-P-3-WS-10

AT-P-3-SB-6

1.0 Chain of Custody/Sample Condition

nits.	The laboratory case narrative indicated that the LCS, MS/MSD, surrogate, and internal standard recoveries were outside OC limits.	Note:
X	analytical problems or special circumstances affecting the quality of the data?	1.7
1	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,	13
X	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	1.2
\mathbf{X}^{-1}	Do Chain-of-Custody forms list all samples analyzed?	1.1

Yes

The laboratory case narrative indicated that the LCS, MS/MSD, surrogate, and internal standard recoveries were outside QC limits.

The narrative also indicated that the method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

					res	ON	INA
2.1	Do sample preserva	Do sample preservation, collection and storage condition meet method requirement?	ge condition meet meth	od requirement?	X		
	If sample preservation	on and/or temperature wa	as inappropriate (i.e., <	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or			
	temperature is outsix	de the range 0° (but not f.	rozen) to 10° flag all p	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds	temperature exceeds 10°, flag positive detections "	ions "J" and non-detects "R".	ts "R".			
2.2	Have any technical	Have any technical holding times, determined from	d from sampling to dat	sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical	holding times been gross	ly (twice the holding ti	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	No	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			X
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			×
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			×

Note:

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		I es	0	V
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	×		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		X	:
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
	butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory		·	
	"J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: Methylene chloride was detected in one method blank

Code	Z	
New RL	-	
Qualification	U	
Analyte	Methylene Chloride	
Field ID	AT-Q-19-SS-1.5RE	

5.0 GC/MS Initial Calibration (Code C)

X	X		×	×	
Are Initial Calibration summary forms present and complete for each instrument used?	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.
5.1	5.2		5.3	5.4	5.5

Note:

6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			X
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $<$ 20%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.		••••	
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

7.0 Surrogate Recovery (Code S)

					~~~	 
7.1	Are all sample	s listed on the appropriate S	Are all samples listed on the appropriate Surrogate Recovery Summary Form $^{?}$	orm?	X	
7.2	Are surrogate	Are surrogate recoveries within acceptance criteri	e criteria specified in the QAPP for all samples?	o for all samples?	X	
7.3	If No in Sectio	If No in Section 7.2, were these sample(s) or meth	or method blank(s) reanalyzed?	6		X
7.4	If No in Sectio	If No in Section 7.3, is any sample dilution factor	n factor greater than 10? (Surre	greater than 10? (Surrogate recoveries may be diluted out.)		Х
	Note: If SMC	recoveries do not meet acce	sptance criteria in samples chos	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no		
	reanalysis is required.	quired.				
		> UCL	10% to LCL	< 10%		
	Positive	J	J	J		
	Non-detect None	None	UJ	R		

Several samples had surrogate recoveries outside QC limits. Qualifications are listed below. Note:

	Surrogate	Surrogate Recoveries	Suffogate Limits
AT-Q-22-SB-6	4-Bromodifluorobenzene	61	68-121
AT-Q-22-SB-6RE	4-Bromodifluorobenzene	44	68-121
AT-Q-19-SS-1.5	4-Bromodifluorobenzene	43	68-121
AT-Q-19-SS-1.5RE	4-Bromodifluorobenzene	44	68-121
AT-P-5-SB-6	4-Bromodifluorobenzene	09	68-121
AT-P-5-SB-6RE	4-Bromodifluorobenzene	65	68-121

		_		r		
Code	8	S	S	S	S	S
Qualification	J/UJ	J/UJ	J/UJ	J/UJ	J/UJ	J/UJ
Analyte	All VOCs	All VOCs	All VOCs	All VOCs	All VOCs	All VOCs
Field ID	AT-Q-22-SB-6	AT-Q-22-SB-6RE	AT-Q-19-SS-1.5	AT-Q-19-SS-1.5RE	AT-P-5-SB-6	AT-P-5-SB-6RE

		S		W
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		-
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			
Note:	The MS/MSD had one analyte outside QC limits; however the corresponding LCS was within QC limits. No qualification of data was required.	lata was requ	iired.	٠

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		I es	ONI	INA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	×		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	•	x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
Note:	Several LCS analytes were outside QC limits. Qualifications are listed below.			

LCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-13802	Chloroethane	281	20-140
LCS 680-13802	1,2-Dichloroethane	134	65-133
LCS 680-13802	Bromodichloromethane	142	74-128
LCS 680-14230	Chloroethane	545	20-140
LCS 680-14230	Chlorobenzene	80	81-120
LCS 680-14387	Carbon Tetrachloride	15	62-140
LCS 680-14387	1,1,2-Trichloroethane	5	76-120
LCS 680-14557	1,1,1-Trichloroethane	145	58-139
LCS 680-14908	Styrene	8.2	80-118
LCS 680-15718	Tetrachloroethene	75	79-132
LCS 680-15718	Chlorobenzene	78	81-120
LCS 680-15718	Styrene	79	80-118

AT-P-5-SB-6REChlorobenzeneAT-Q-22-SB-6RECarbon TetrachlorideAT-Q-22-SB-6RE1,1,2-TrichloroethaneAT-Q-19-SS-1.5RECarbon TetrachlorideAT-Q-19-SS-1.5RE1,1,2-TrichloroethaneAT-P-3-WS-10StyreneAT-P-3-WS-10DLStyreneAT-P-3-SB-6StyreneAT-P-3-SS-0.5Tetrachloroethene	ſ	
		_1
	de UJ	Т
Carbon 1,1,2-Ti 5	me UJ	Т
	de UJ	Т
	ine UJ	Т
	ſ	Т
	Û	Т
	UJ	Т
	ſſ	7
AT-P-3-SS-0.5 Chlorobenzene	UJ	Т
AT-P-3-SS-0.5 Styrene	UJ	П
AT-P-5-SS-0.5 Tetrachloroethene	ſ	П
AT-P-5-SS-0.5 Chlorobenzene	ſ	Т
AT-P-5-SS-0.5 Styrene	UJ	Γ

#### 10.0 Internal Standards (Code I)

						) .	
10.1	Are internal standa	Are internal standard areas for every sample and blank within upper and lower QC limits?	lank within upper and lowe	r QC limits?		X	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	m	R			
	The method specif	ication is for the continuing cal	ibration to be compared to t	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibrat	ion. Thus, if all other QC spec	fications are met for a giver	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,			
	the reviewer may c	he reviewer may choose not to flag individual samples in this case.	nples in this case.				
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	seconds of the associated c	alibration standard?	×		
	Action: The chron	natogram must be examined to	determine if any false positi	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the rev	iewer may consider partial or to	stal rejection of the data for	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	·		

Several internal standards had recoveries outside QC limits. Qualifications are listed below. Note:

Code	I	П	I
Qualification	J/UJ	JU/I	J/UJ
IS Recovery High/Low	Low	Low	Low
Analyte	All VOCs	All VOCs	All VOCs
Field ID	AT-Q-22-SB-6	AT-Q-19-SS-1.5	AT-P-5-SB-6

#### 11.0 TCL Identification (Code W)

111	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing		
11.1	calibration?		×
11.7	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do		
7.11	sample and standard relative ion intensities agree within 30%?		×

Note:

8/7/2006

## 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		20.1	7.10	1178
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

### 13.0 Field Duplicate Samples (Code F)

		22.1	7.1	* 7
13.1	Were any field duplicates submitted for VOC analysis?	x		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-30-SS-1 was the parent sample of AT-Q-30SS-1-D.

#### 14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	for aqueous sample, 90% for soil	•		
1	sample)		- C. C. C. C. C. C. C. C. C. C. C. C. C.		
14.2	Number of samples:	11			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$				
	% Completeness	100			

#### SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION WORKSHEET

Severn Trent Laboratory - Savannah Bart Brandenburg 9/7/2005 Laboratory Reviewer: Date:

Project Number: Project Name: SDG No.:

21561510.60011 Level III **SAS 025** 

Sauget - Area 2

Review Level:

Major Anomalies:

Samples were rejected based on LCS recoveries.

#### Minor Anomalies:

Field IDs:

Samples were qualified based on LCS, surrogate, and internal standard recoveries.

AT-Q-22-SS-0.5 AT-Q-29-SS-1 AT-P-3-SS-0.5 AT-Q-30-SS-1-D AT-Q-19-SS-1.5 AT-P-5-SB-6 AT-P-5-WS-12 AT-Q-22-SB-6 AT-Q-30-SS-1

1.0 Chain of Custody/Sample Condition

			-	
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×		:
Note:	The MS/MSD, LCS, surrogate, and internal standard recoveries were outside OC limits.		W. C. C. C. C. C. C. C. C. C. C. C. C. C.	

**N** 

Yes

AT-P-3-SB-6

AT-P-3-WS-10

AT-P-5-SS-0.5

The MS/MSD, LCS, surrogate, and internal standard recoveries were outside QC limits.

The method blank had detections above the MDL.

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10			
	OC), then flag all positive results with a "J" and all non-detects "UJ".			
	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table			
7:7	for sample holding time) If yes, J(+)/UJ(-).		¥	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

## 3.0 GC/MS Instrument Performance Check (Code T)

		S	I CS	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			×
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note

# 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	×		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?	x		
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

Pentachlorophenol recovered above the MDL in the method blank; however, pentachlorophenol was reported non-detect for all associated samples. No qualification of data was required.

### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds $< 0.05$ (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$ .			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

### 6.0 Continuing Calibration (Code C)

		X es	0	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $< 20\%$ )?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

#### 7.0 Surrogate Recovery (Code S)

					ICS	ONI	IVA
7.1	Are all samp	les listed on the appropr	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	y Form?	X		
7.2	Are surrogate	recoveries within accep	ptance criteria specified in the QA	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		х	
7.3	Are more tha	n one of either fraction	Are more than one of either fraction outside the acceptance criteria?		Х		
7.4	If Yes in Sect	ion 7.3, are these sampl	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	ζp		x	
7.5	If Yes in Sect	tion 7.3, is any sample d	If Yes in Section 7.3, is any sample dilution factor greater than 10?				х
	Note: If SMG	C recoveries display una	ecceptable recoveries in the MS an	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids			
-	and base/ neu	and base/ neutrals are assessed separately.	ately.				
		> NCL	10% to LCL	<10%			
	Positive	J	J	ſ			
	Non-detect	None	UJ	R			

All samples had surrogate recoveries outside QC limits. Qualifications are listed below. A list of recoveries can be submitted upon request. Note:

All SVOCs  All Acid/fraction analytes  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs  All SVOCs	Field ID	Analyte	Qualification	Code
All SVOCs All Acid/fraction analytes All SVOCs All SVOCs All Acid/fraction analytes All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs	AT-Q-22-SB-6	All SVOCs	J/UJ	S
All Acid/fraction analytes All SVOCs All SVOCs All Acid/fraction analytes All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs	AT-Q-19-SS-1.5	All SVOCs	J/UJ	S
All SVOCs All SVOCs All Acid/fraction analytes All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs	AT-Q-22-SS-0.5	All Acid/fraction analytes	J/UJ	S
All SVOCs All Acid/fraction analytes All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs All SVOCs	AT-Q-30-SS-1	All SVOCs	J/UJ	S
All Acid/fraction analytes All SVOCs All Acid/fraction analytes All SVOCs All SVOCs All SVOCs All SVOCs	AT-Q-30-SS-1-D	All SVOCs	J/UJ	S
All SVOCs All Acid/fraction analytes All SVOCs All SVOCs All SVOCs All SVOCs	AT-Q-29-SS-1	All Acid/fraction analytes	J/UJ	S
All Acid/fraction analytes All SVOCs All SVOCs All SVOCs All SVOCs	AT-P-5-WS-12	All SVOCs	J/UJ	S
All SVOCs All SVOCs All SVOCs	AT-P-5-SB-6	All Acid/fraction analytes	J/UJ	S
All SVOCs All SVOCs All SVOCs	AT-P-3-SS-0.5	All SVOCs	J/UJ	S
All SVOCs All SVOCs	AT-P-5-SS-0.5	All SVOCs	J/UJ	S
All SVOCs	AT-P-3-WS-10	All SVOCs	J/UJ	S
	AT-P-3-SB-6	All SVOCs	J/UJ	S

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		Х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria			
	and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection.		•	
	RPD failures may be flagged "J" (+ only)			

Several analytes were outside QC limits for the MS/MSD sample, however the LCS was within QC limits; therefore, no qualification of data was required. Note:

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No No	NA
Is an LCS recovery form present?	sent?	X		
Is LCS analyzed at the requir	Is LCS analyzed at the required frequency for each matrix?	×		
Are all LCS %Rs (and RPDs) within acceptance criteria?	within acceptance criteria?		×	
Action for specific compound should be flagged "J" (+ only)	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
If Level IV, verify the % recoveries are calculated correctly	veries are calculated correctly.			×

The LCS had two analyte recoveries outside QC limits. Qualifications are listed below. Note:

TCS ID	Analyte	LCS Recoveries	LCS Limits
LCS 680-13397	2,4-Dinitrophenol	0	1-131
LCS 680-13397	Pentachlorophenol	11	27-116

Field ID	Analyte	Qualification	Code
AT-Q-22-SB-6	2,4-Dinitrophenol	R	L
AT-Q-22-SB-6	Pentachlorophenol	U	L
AT-Q-19-SS-1.5	2,4-Dinitrophenol	R	L
AT-Q-19-SS-1.5	Pentachlorophenol	ÚJ	L
AT-Q-22-SS-0.5	2,4-Dinitrophenol	R	T
AT-Q-22-SS-0.5	Pentachlorophenol	UJ	L
AT-Q-30-SS-1	2,4-Dinitrophenol	R	T
AT-Q-30-SS-1	Pentachlorophenol	UJ	7
AT-Q-30-SS-1-D	2,4-Dinitrophenol	R	Т
AT-Q-30-SS-1-D	Pentachlorophenol	UJ	Т
AT-Q-29-SS-1	2,4-Dinitrophenol	R	T
AT-Q-29-SS-1	Pentachlorophenol	ſΩ	Т
AT-P-5-WS-12	2,4-Dinitrophenol	R	T
AT-P-5-WS-12	Pentachlorophenol	UJ	. 1
AT-P-5-SB-6	2,4-Dinitrophenol	R	7
AT-P-5-SB-6	Pentachlorophenol	UJ	7
AT-P-3-SS-0.5	2,4-Dinitrophenol	R	7
AT-P-3-SS-0.5	Pentachlorophenol	UJ	Т
AT-P-5-SS-0.5	2,4-Dinitrophenol	R	Т
AT-P-5-SS-0.5	Pentachlorophenol	UJ	Т
AT-P-3-WS-10	2,4-Dinitrophenol	R	7
AT-P-3-WS-10	Pentachlorophenol	UJ	Т
AT-P-3-SB-6	2,4-Dinitrophenol	R	T
AT-P-3-SB-6	Pentachlorophenol	U	L

#### 10.0 Internal Standards (Code I)

					123	INO	INA
10.1	Are internal standar	rd area of every sample and blan	k within upper and lower (	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?		x	
		Area > +100%	Area < -50%	Area < -10%			
-	Positive	J		ſ			
-	Non-detect	None	UJ	R			
	The method specifi	cation is for the continuing calib	ration to be compared to th	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibrati	ion. Thus, if all other QC specifi-	cations are met for a given	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the			
	reviewer may choo	reviewer may choose not to flag individual samples in this case.	in this case.				
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	econds of the associated ca	ulibration standard?		×	
	Action: The chrom	natogram must be examined to de	termine if any false positiv	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude,			
	the reviewer may co	the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	of the data for non-detects i	in that sample/fraction.			

Several samples had internal standard recoveries outside QC limits. Qualifications are listed below. Note:

	1	<u> </u>		_	T	Т
Code	I	I	П	I	H	ı
IS recovery High/Low	Low	High	High	High	High	High
Qualification	J/UJ	Ţ	ſ	J	I	ſ
Analyte	All SVOCs	All detected SVOCs	All detected SVOCs	All detected SVOCs	All detected SVOCs	All detected SVOCs
Field ID	AT-Q-22-SS-0.5	AT-Q-22-SB-6	AT-Q-29-SS-1	AT-P-5-WS-12	AT-P-3-WS-10	AT-P-3-SB-6

#### 11.0 TCL Identification (Code W)

		Ves	NO.	Ϋ́
		~ ~ ~	21.1	***
-	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
11.1	calibration?			×
		8000000		
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do			
7:11	sample and standard relative ion intensities agree within 30%?			×

Note:

8/7/2006

12.1	Are RLs used consistent with those specified in the QAPP?	X
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?	x
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations	

Yes

Note:

### 13.0 Field Duplicate Samples (Code F)

		Yes	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-30-SS-1 was the parent sample of AT-Q-30-SS-1-D

#### 14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	or soil sample)	X		
14.2	Number of samples:				
14.3	Number of target compounds in each analysis:				
14.4	Number of results rejected and not reported:				
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$			,	
	% Completeness 98.5	2			

#### DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer: Bart Brandenburg

Date: 9/7/2005

Laboratory Severn Trent Laboratory - Savannah

Project Name:
Project Number:
SDG No.:

Review Level:

Sauget - Area 2 21561511.60011 SAS 025 Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

Field IDs:

AT-Q-22-SB-6 AT-P-5-WS-12

AT-Q-22-SS-0.5 AT-P-3-WS-10

AT-Q-29-SS-1 AT-P-3-SB-1

1.0 Chain of Custody/Sample Condition

		23	2	2
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×		i

The laboratory case narrative indicated that the MS/MSD, LCS, and surrogate recoveries were outside QC limits Note:

The narrative also indicated that the method blank had analytes detected above the MDL.

#### 2.0 Holding Time/ Preservation (Code H)

2.1 Do sample preservation, collection and storage condition meet method requirement?  If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated  (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".  Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding  Time Table for sample holding time) If yes, J(+)/UJ(-).  Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days  Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).			S	Tes ON Sal	ď.
If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated  (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".  Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding  Time Table for sample holding time) If yes, I(+)/UJ(-).  Extraction: Soil/Sediment 14 days - aqueous 7 days  Analysis: 40 days  Have any technical holding times grossly (twice the holding time) been exceeded? If yes, I(+)/R(-).	2.1	Do sample preservation, collection and storage condition meet method requirement?	x		•
(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".  Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time). If yes, J(+)/UJ(-).  Extraction: Soil/Sediment 14 days - aqueous 7 days. Analysis: 40 days.  Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevate	P		
Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Table for sample holding time) If yes, J(+)/UJ(-).  Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days  Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		$(> 10^{9}\text{C})$ , then flag all positive results with a "J" and all non-detects "UJ".			
Time Table for sample holding time) If yes, J(+)/UJ(-).  Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days  2.3 Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	٠,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days  2.3 Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).	-50-749-03	×	
2.3 Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
	2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No NA	A A
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results (TCL)?		×	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

The method blank for PCBs had a detection above the MDL. All associated samples were either non-detect or had recoveries greater than 5X the blank contamination. No qualification of data was required. Note:

## 4.0 GC/ECD Instrument Performance Check (Code B)

	100000000000000000000000000000000000000	Yes	°Z	Y Y
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

#### 5.0 Initial Calibration (Code R)

		2	OLI OLI	5
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R"			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

#### 6.0 Continuing Calibration (Code C)

ĺ		20.1	21.7	7717
	6.1 Are Continuing Calibration Summary forms present and complete?			x
1	Has a continuing calibration standard been analyzed every 12 hours?			×
l	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < $15\%$ )?			×
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$ . For %D > 50%, flag R			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			
ı				

Note:

#### 7.0 Surrogate Recovery (Code S)

					I es	<u> </u>	A.
7.1	Are all samples listed on the	s listed on the ap	he appropriate Surrogate Recovery Summary Form?	y Summary Form?	×		
7.2	Are surrogate recoveries v	recoveries within	acceptance criteria specifie	within acceptance criteria specified in the QAPP for all samples?	×		
7.3	If No in Section	on 7.2, were these	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	s) reanalyzed?			×
7.4	If No in Section 7.3, is any	n 7.3, is any sam	ple dilution factor greater th	sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> UCL	10% to LCL	< 10%			
	Positive	J	ſ	ſ			
	Non-detect	None	U	R			

Note: Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Surrogate Limits	30-130	30-130
Surrogate Recoveries	7	26
Surrogate	Decachlorobiphenyl-13C12	Decachlorobiphenyl-13C12
Field ID	AT-P-3-WS-10	AT-P-3-SB-6

Qualification	S I/UI	J/UJ S
Analyte	All PCBs	All PCBs
L Q	AT-P-3-WS-10	AT-P-3-SB-6

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		S	WI 011 531	4
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	×		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may			
Note:	The MS/MSD sample AT-Q-22-SS-0.5 had recoveries below QC limits for all analytes. Qualifications are listed below.			

Code	W
Qualification	J/UJ
Analyte	All PCBs
Field ID	AT-Q-22-SS-0.5

## 9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

A N				x		
Yes No NA			×			
Yes	x	x				
	9.1 Is an LCS recovery form present?	9.2 Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	9.3 Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	9.4 If Level IV, verify the % recoveries are calculated correctly.	Action for specific compound outside the acceptance criteria: %R>UCL,  I(+) only: <i "i"="" (+="" 10%="" <="" be="" cl="" failures="" flagged="" i(+)="" iii(-)="" ir(-)="" only)<="" rpd="" should="" th=""><th>( ) cm), ccc, ( ), co( ), co( ), co( ), co( )</th></i>	( ) cm), ccc, ( ), co( ), co( ), co( ), co( )

The LCS had recoveries outside the QC limits. Qualifications are listed below. Note:

TCS ID	Analyte	LCS Recovery	LCS Limits
LCS 680-13784	Monochlorobihpenyl	29	30-130
LCS 680-13784	Tetrachlorobiphenyl	33	40-140
LCS 680-13784	Pentachlorobiphenyl	34	40-140
LCS 680-13784	Hexachlorobiphenyl	34	40-140
LCS 680-13784	Heptachlorobiphenyl	35	40-140
LCS 680-13784	Octachlorobiphenyl	35	40-140

Field ID	Analyte	Qualification	Code
AT-Q-22-SB-6	Monochlorobihpenyl	UJ	Г
AT-Q-22-SB-6	Tetrachlorobiphenyl	U	Г
AT-Q-22-SB-6	Pentachlorobiphenyl	m	Т
AT-Q-22-SB-6	Hexachlorobiphenyl	m	Г
AT-Q-22-SB-6	Heptachlorobiphenyl	ſſſ	L
AT-Q-22-SB-6	Octachlorobiphenyl	m	Г
AT-Q-22-SS-0.5	Monochlorobihpenyl	m	Т
AT-Q-22-SS-0.5	Tetrachlorobiphenyl	ſΩ	Т
AT-Q-22-SS-0.5	Pentachlorobiphenyl	m	Т
AT-Q-22-SS-0.5	Hexachlorobiphenyl	ſſſ	Г
AT-Q-22-SS-0.5	Heptachlorobiphenyl	ſſ	Т
AT-Q-22-SS-0.5	Octachlorobiphenyl	ſſ	Т
AT-Q-29-SS-1	Monochlorobihpenyl	ſΩ	Г
AT-Q-29-SS-1	Tetrachlorobiphenyl	UJ	Т
AT-Q-29-SS-1	Pentachlorobiphenyl	U	
AT-Q-29-SS-1	Hexachlorobiphenyl	U	Т
AT-Q-29-SS-1	Heptachlorobiphenyl	U	Г
AT-Q-29-SS-1	Octachlorobiphenyl	ſŊ	Т
AT-P-5-WS-12	Monochlorobihpenyl	ſ	Т
AT-P-5-WS-12	Tetrachlorobiphenyl	J	Γ
AT-P-5-WS-12	Pentachlorobiphenyl	UJ	Γ
AT-P-5-WS-12	Hexachlorobiphenyl	ſ	Г
AT-P-5-WS-12	Heptachlorobiphenyl	ſ .	T
AT-P-5-WS-12	Octachlorobiphenyl	ı	Г
AT-P-5-WS-12DL	Monochlorobihpenyl	J	Г

Field ID	Analyte	Qualification	Code
AT-P-5-WS-12DL	Tetrachlorobiphenyl	UJ	Т
AT-P-5-WS-12DL	Pentachlorobiphenyl	f	T
AT-P-5-WS-12DL	Hexachlorobiphenyl	ſ	7
AT-P-5-WS-12DL	Heptachlorobiphenyl	ſ	Т
AT-P-5-WS-12DL	Octachlorobiphenyl	ſ	Т
AT-P-3-WS-10	Monochlorobihpenyl	ſ	Т
AT-P-3-WS-10	Tetrachlorobiphenyl	ſſ	П
AT-P-3-WS-10	Pentachlorobiphenyl	ſ	Т.
AT-P-3-WS-10	Hexachlorobiphenyl	ſ	Т
AT-P-3-WS-10	Heptachlorobiphenyl	ſ	Т
AT-P-3-WS-10	Octachlorobiphenyl	ſ	Т
AT-P-3-WS-10DL	Monochlorobihpenyl	ſſ	Т
AT-P-3-WS-10DL	Tetrachlorobiphenyl	J	$\mathbf{T}$
AT-P-3-WS-10DL	Pentachlorobiphenyl	J	Т
AT-P-3-WS-10DL	Hexachlorobiphenyl	ſ	П
AT-P-3-WS-10DL	Heptachlorobiphenyl	UJ	Т
AT-P-3-WS-10DL	Octachlorobiphenyl	UJ	Т
AT-P-3-SB-6	Monochlorobihpenyl	UJ	Т
AT-P-3-SB-6	Tetrachlorobiphenyl	ſ	П
AT-P-3-SB-6	Pentachlorobiphenyl	ſ	. Т
AT-P-3-SB-6	Hexachlorobiphenyl	J	Т
AT-P-3-SB-6	Heptachlorobiphenyl	f	Т
AT-P-3-SB-6	Octachlorobiphenyl	UJ	Т

#### 10.0 TCL Identification (Code W)

		;		ш
		] Yes	No No	_
101	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			_
10.1	calibration?			
		A TATAL STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET, STREET		1

NA

## 11.0 TCL Quantitation and Reported Detection limits (Code P)

			!
11.1	Are RLs used consistent with those specified in the QAPP?		×
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
11.4	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

#### 12.0 Field Duplicate Samples (Code F)

		~~~		4 5
12.1	Were any field duplicates submitted for analysis?		X	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			x
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

13.0 Data Completeness

		Yes	No.	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	я		
13.2	Number of samples: 6			
13.3	Number of target compounds in each analysis:			
13.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			
	% Completeness			

Zoz

DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Bart Brandenburg 9/8/2005 Reviewer: Date: Severn Trent Laboratory - Savannah

Laboratory

Project Number: Project Name: SDG No.:

Review Level:

21561510.60010 Sauget - Area 2 SAS 025 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

AT-Q-22-SB-6 Field IDs:

AT-Q-19-SS-1.5 AT-Q-30-SS-1-D

AT-P-3-WS-10 AT-P-5-SB-6

> AT-P-5-WS-12 AT-P-5-SS-0.5

AT-Q-30-SS-1

AT-Q-22-SS-0.5 AT-P-3-SS-0.5 AT-Q-29-SS-1

AT-P-3-SB-6

1.0 Chain of Custody/Sample Condition

		Yes	2°	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X		

The laboratory case narrative indicated the MS/MSD had recoveries outside the QC limits.

2.0 Holding Time/ Preservation (Code H)

		3	2	T.
2.1	Do sample preservation, collection and storage condition meet method requirement?	x		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		3	2	
3.1	Is a Method Blank Summary form present for each batch?	¥		
3.2	Do any method blanks have positive results?		×	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
:	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code R)

		I es	NO NA	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

5.0 Continuing Calibration (Code C)

		Yes	0 N	Y V
5.1	Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 12 hours?			×
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 20%)?			×
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For %D > 50%, flag R.			<u>.</u>
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	ŝ	NA
6.1	Are all sample	Are all samples listed on the appropriate	e Surrogate Recovery Summary Form?	y Form?	X		
6.2	Are surrogate	recoveries within acceptar	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	APP for all samples?	X		
6.3	If No in Sectic	on 6.2, were these sample(If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?	red?			×
6.4	If No in Sectic	on 6.3, is any sample diluti	ion factor greater than 10? (Su	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
		> UCL	10% to LCL	<10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No NA	A Z
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	¥		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria Specified in the QAPP?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other			
	QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10%			
	may require rejection. RPD failures may be flagged "J" (+ only)			

The MS/MSD sample AT-Q-22-SS-0.5 had recoveries outside QC limits; however, the LCS recoveries were within QC limits. No qualification of data was required.

8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		27.7	,	
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

9.0 TCL Identification (Code W)

		3	2		_
•	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the				
9.1	continuing calibration?			×	_

Note:

10.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	%	NA
10.1	Are RLs used consistent with those specified in the QAPP?			х
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			Х
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

11.0 Field Duplicate Samples (Code F)

		r es	0	NA NA
11.1	Were any field duplicates submitted for herbicide analysis?	X		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	Х		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-30-SS-1 was the parent sample for AT-Q-30-SS-1-D

12.0 Data Completeness

			Yes	o Z	A A
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	0% for soil	×		
	sample)		ı		
12.2	Number of samples:				
12.3	Number of target compounds in each analysis:				
12.4	Number of results rejected and not reported:				
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness 100				

DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

21561510.60011 Sauget - Area 2 Project Number: Project Name: Bart Brandenburg 9/8/2005 Reviewer:

Severn Trent Laboratory - Savannah Laboratory

Date:

No samples were rejected

Major Anomalies:

Minor Anomalies:

Field IDs:

Review Level:

SDG No.:

SAS 025 Level III

AT-Q-30-SS-1-D AT-Q-19-SS-1.5

Samples were qualified based on MS/MSD recoveries and field duplicate RPDs.

AT-Q-22-SB-6

AT-Q-30-SS-1

AT-P-5-WS-12 AT-P-5-SS-0.5

AT-Q-29-SS-1

AT-Q-22-0.5

AT-P-5-SB-6

AT-P-3-SS-0.5 AT-P-3-WS-10

AT-P-3-SB-6

CVAA-Hg

GFAA

ICP-MS

ICP

1.0 Chain of Custody/Sample Condition/Raw Data

								-			ı	Ī
		Yes No NA Yes No NA Yes No NA Yes No NA	No N	Yes	No	NA Y	es	N or	4 Yes	% No	Ň	-
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	×							X			
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X							×			
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x								×		<u> </u>
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$)	×			Y . ' (s)				×			
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete x documentation, contact the laboratory for explanation/resubmittal.	X							×	\$10-99 C/A		

The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits. Note:

The narrative also indicated that the method blanks had recoveries above the MDL.

2.0 Holding Time (Code H)

		ICP		ICP-MS	S	GFAA		CVAA-Hg	\A-H
	Yes	No No	'A Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA	s No	NA	se /	°Z
Have any technical holding times, determined from date of collection to date of analysis, been								3.2	
exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		×			٠				×
Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)									
J(+)/R(-).						* .4 1\$7			

Note:

3.0 Instrument Calibration (Code C)

						ICP	ICP-MS	G.	GFAA	CVA	CVAA-Hg	
					Yes	No NA Yes		No NA Yes	No NA Yes		No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)	bration curve? (ank + five standa	ICP/ICP-MS: bla rds)	ınk + one standard;		×						
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).	or GFAA and CV	'AA) Action: J(+	-)/UJ(-).								×
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	CV) analyzed are offeod are offeod are of the of	t the beginning ct on the data an	ICV) analyzed at the beginning of each analysis? to determine affect on the data and note in reviewer		×						×
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	CV) performed o, use profession	every 10 analysis	s or every 2 hours, letermine affect on		X						×
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	veries (ICV and %-110%).	l CCV) within t	he control limits?		×						×
	Action: R(+/-)	J(+)/UJ(-)	J(+)	R(+)								
	Mercury < 65%	65% - 79%	121% - 135%	> 135%								
	Other Metals < 75%	75% - 89%	111% - 125%	> 125%							_	

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP	_	ICP-MS	S	GF	GFAA	CA	CVAA-Hg	lg.
		Yes	2 2	No NA Yes	-	No NA Yes		No NA Yes		No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	×				Edd			×		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	×								М	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	X							×		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	×							×		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	×					74.5			Х	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		×							×	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, $J(+)/UJ(-)$.		X						***************************************	×	

Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required. Note:

CVAA-Hg

GFAA

ICP-MS

ICP

5.0 ICP Interference Check Sample (ICS) (Code N)

							Xes	2 2	A Yes	ž	NA Yes	2 Z	Yes No NA Yes No NA Yes No NA Yes No NA	ž	NA
	Was ICS A.	B analyzed at l	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the	CP run (or at	least twice every	8 hours), and at the	1 6	Ħ				ļ 		_	
7.1	beginning o	or once every 8	beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	s more freque	ent) for ICP-MS?				<u> </u>						
5.2	Are the ICS	AB recoveries	Are the ICS AB recoveries within 80% - 120%?	69,					×				-	-	
5.3	Are the resu	ılts for unspike	Are the results for unspiked analytes (in ICS A) < + IDL?	1) < + IDL?					×			-	-		
5.4	If not, are t ICS?	the associated	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?	and Mg con	centrations less t	nan the level in the			<u> </u>			-			
	Action:	Not Spiked Analytes	d Analytes	Spiked	Spiked analytes (ICS AB analytes)	analytes)								_	
		<-IDF	> IDL	< 50%	50% - 79%	> 120%		-							
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)							_		

6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

CVAA-Hg

GFAA

ICP-MS

ICP

							Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	Z	N/	4 Yes	%	NA	Yes	No.	NA
6.1	Was an LC: matrix and I	S prepared and per level)? Ac	Was an LCS prepared and analyzed at the comatrix and per level)? Action: If no, J(+) ar	orrect frequency sample no	correct frequency (one per 20 samples, per lany sample not associated with LCS results.	orrect frequency (one per 20 samples, per batch, per ny sample not associated with LCS results.	×							10 S. S. S. S. S. S. S. S. S. S. S. S. S.	×		
6.2	Is any LCS Sb; Solid lin	recovery outsi nits: as per EP	Is any LCS recovery outside the control lim Sb; Solid limits: as per EPA-EMSL/LV)	its? (Aqueou	ıs limits: 80% -	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		¥								X	
	Action:	Sc	Solid		Aqueous										- 138		
		<ccc> OCC</ccc>	> NCT	< 50%	50% - 79%	> 120%											
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)											

Note:

7.0 Laboratory Duplicates (Code K)

		Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	NA	Yes N	Vo NA	Yes	Z ON	IA Yes	%	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional indement.	×	×*************************************					×		
	analytes not associated with Duplicate results.									
7.7	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional									
7:/	judgment. Note in worksheet.	×							×	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \pm PQL for	30 001								
); ;	aqueous, and RPD < 35% or difference $< \pm 2$ X PQL for solids) Action: If no, J(+).		<u> </u>					*		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.						_		0.38	

CVAA-Hg

GFAA

ICP-MS

ICP

Note: Samples AT-Q-22-SS-0.5 and AT-P-3-SB-6 were analyzed in duplicate.

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

GFAA

ICP-MS

ICP

					Yes	No	VA Ye	ž	Yes No NA Yes No NA Yes		No NA Yes	Yes	οÑ	ΝΑ
8.1	Was a spiked sample prepared and analyz batch, per matrix and per level)? Action: associated with matrix spike results.	analyz ction:	at the correct frequ no, J(+), with profe	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	×							*		
8.2	Was a field blank used Note in worksheet.	for the MS analysis?	Action: If yes, J(Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.	***************************************	Х					Sing 1		X	
	Note: Matrix spike ana sample in an SDG.	alysis may be perforn	ned on a field blan	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.										
8.3	For all analytes with sa within the control limit of x spike concentration.)	ample concentration of 75-125%? (No cor)	< 4 x spike concentrol limit applies to	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike concentration.)		×							×	
	%R > 125%	5% 30% < %R < 74%		%R < 30%							-			
	Positive		ſ	J										-
	Non-detect None	ne	UJ	R							ļ			
Note:	Sample AT-Q-22-SS-0.	5 was spiked and anal	yzed as the MS/MS	Sample AT-Q-22-SS-0.5 was spiked and analyzed as the MS/MSD. The MS/MSD sample had recoveries outside OC limits. Oualifications are listed below	ecoveri	es out	Side O	C limit	s. Oualii	fication	s are li	sted be	× o	

Sample AT-Q-22-SS-0.5 was spiked and analyzed as the MS/MSD. The MS/MSD sample had recoveries outside QC limits. Qualifications are listed below.

Antimony 50 / 47 Barium 73 / 84 Zinc 95 / 147

Field ID	Analyte	Qualifications	Code
AT-Q-22-SS-0.5	Antimony	ſ	M
AT-Q-22-SS-0.5	Barium	J	M
AT-Q-22-SS-0.5	Zinc	ſ	M
AT-Q-22-SS-0.5	Mercury	ſ	M

9.0 Instrument Detection Limits (IDL)

		Yes	No NA	4 Yes	No	IA Yes	No	NA 1	(es	ON.	NA NA
9.1	Are all IDL equal to or less than the reporting limits specified?		×								×

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

10.0 ICP Serial Dilutions (Code S)

		Ī	ICP		ICP-MS		GFAA	C	CVAA-Hg	Яg
		Yes	29	IA Yes	No N	IA Yes	Yes No NA Yes No NA Yes No NA Yes No NA	Yes	οÑ	NA
10.1	Were serial dilutions performed?	X								
10.2	Was a five-fold dilution performed?	Х								
10.3	Did the serial dilution results agree within 10% for analyte concentration $> 50 \times 10$ x the IDL in the original sample? If no, $J(+)$.	X	 							

Samples AT-P-3-SS-0.5, AT-Q-22-SS-0.5, and AT-P-3-SB-6 were diluted and analyzed, all %Ds were within QC limits.

11.0 Field Duplicate Samples (Code F)

			ICP)I	ICP-MS		GFAA	-	CVAA-Hg	A-H	50
		Yes	Yes No NA Yes No NA Yes No NA Yes No NA	Yes	No NA	Yes	οN	NA Y	es		NA
11.1	Were any field duplicates submitted for metal analysis?	×							X		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < +2 x POL and for solids. RPD < 100% or difference < +4 x POL).		×						×		
Note:	Sample AT-Q-30-SS-1 was the parent sample for AT-Q-30-SS-1-D, %RPD was outside QC limits. Qualifications are listed below.	ts. Ou	alification	s are li	sted belo	 š	1			╢]

Sample AT-Q-30-SS-1 was the parent sample for AT-Q-30-SS-1-D, %RPD was outside QC limits. Qualifications are listed below.

100 V S	i	T
Code	Ŧ	F
Qualifications	ſ	ſ
Analyte	Zinc	Zinc
Field ID	AT-Q-30-SS-1	AT-q-30-SS-1-D

12.0 Result Verification (Code Q)

			ICP	I	ICP-MS		GFAA	 ∀	CA7	CVAA-Hg	56
		Yes	Yes No NA Yes No NA Yes	Yes	No	NA Yes	²	No NA Yes	es	No NA	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?		×								×
12.2	Were all dilution reflected in the positive results and detection limits?		×							-	×

Note:

13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for					
13.1	aqueous sample, 90% for soil sample)					
13.2	Number of samples:	12	0	0		12
13.3	Number of target compounds in each analysis:	22	0	0	. 	-
13.4	Number of results rejected and not reported:	0	0	0		0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$				•	
	% Completeness	<u>1</u>	####	####	1	100

DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Project Number: Project Name: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 9/8/2005 Laboratory Reviewer: Date:

Sauget - Area 2 21561510.60011 SAS 025 Level III

Review Level:

Major Anomalies:

Ammonia

350.1

Test Name: Method No.: No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Field IDs: AT-Q-22-SB-6 AT-Q-19-SS-1.5 AT-Q-30-SS-1

AT-P-5-SS-0.5 AT-P-3-WS-10

AT-P-5-SB-6

AT-P-5-WS-12

AT-Q-29-SS-1 AT-P-3-SS-0.5 AT-P-3-SB-6

AT-Q-22-SS-0.5

1.0 Chain of Custody/Sample Condition

		201	7	¢.
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
- ''	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			
7:1	samples, analytical problems or special circumstances affecting the quality of the data?		×	

		Yes	S Z	NA V
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).	<u> </u>	X	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	
			2.7.7	

Note:

3.0 Blanks (Met

		Y es	No	Y V
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		Yes	2 Z	A V
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			X
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.		-	

Note:

8/7/2006

5.0 Continuing Calibration (Code R)

		Yes	No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 10 samples?			×
5.3	Do any analytes have a %R outside QC limits (80-120%)?			×
	If yes, a marginal increase in response >20% then J(+) only, a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	×		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
-	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)	-		

e: The MS/MSD sample AT-Q-22-SS-0.5 had all recoveries within QC limits.

7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		3	2	4
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td>-</td><td></td></lcl,>		-	

8.0 Analyte Identification

		Yes	°Z	NA	_
2	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT				
	in the continuing calibration?			×	

Note:

9.0 Analyte Quantitation and Reported Detection limits

		153	ONT	
9.1	Are RLs used consistent with those specified in the QAPP?	111		×
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			
9.4	If Level IV calculate a sample of nositive results to verify correct calculations			

Note:

10.0 Field Duplicate Samples (Code F)

		res	00	AN.
10.1	Were any field duplicates submitted?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample AT-Q-30-SS-1 was the parent sample of AT-Q-30-SS-1-D.

11.0 Laboratory Duplicates (Code K)

		2	TAIL ON	O.I
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and			
	per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	×		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		Α.	
	Are all analyte duplicate results within control? (RPD values < 20% or difference < + PQL for aqueous, and RPD < 35%			
11.3	or difference $< \pm 2$ X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate	À		
	results are > 5 X IDL.	đ	_	

Note: Sample AT-P-3-SB-6 was analyzed as the laboratory duplicate sample.

12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	soil 🔭		_
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness	<u> </u>		

•					
				,	

DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Severn Trent Laboratory - Savannah Bart Brandenburg 9/8/2005 Laboratory Reviewer: Date:

21561510.60011 Sauget - Area 2 SAS 026 Level III

Project Number: Project Name:

Review Level:

SDG No.:

Major Anomalies:

No samples were rejected

Minor Anomalies:

Field IDs:

Samples were qualified based on LCS recoveries, field duplicate RPDs, and holding time criteria.

SA-O-2-WS-9-D SA-Q-3-WS-12 SA-P-3-WS-14 SA-O-3-WS-9 AT-Q-31-WS-12 SA-O-2-WS-9 SA-P-1-WS-8 SA-0-1-SB-3 AT-Q-28-WS-16 SA-Q-6-WS-16 AT-Q-25-WS-9 SA-0-4-SB-6 SA-P-2-WS-9

1.0 Chain of Custody/Sample Condition

		23.1	TCS IVA	W
1:1	Do Chain-of-Custody forms list all samples analyzed?	X		
		*** COMMENT TO A SECOND		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Å		
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Sepondary Community		
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples			
C:1	Constitution and the constitution of the const	,		_
	analy it call problems of special circumstances affecting the quality of the data?	<		
				_
Note:	The Jahoratory case narrative indicated that the mathod blond dottood it and it is it is a second in the second in	: 0		
	STATE OF A LINE OF A LINE OF THE STATE OF TH			

The laboratory case narrative indicated that the method blank had detections above the MDL, and the LCS had recoveries outside QC limits.

The narrative also indicated that samples were analyzed outside holding time criteria.

2.0 Holding Time/ Preservation (Code H)

					Yes	9 2	¥Z
2.1	Do sample preservati	Oo sample preservation, collection and storage condition meet method requirement?	ge condition meet met	nod requirement?		×	
	If sample preservation	n and/or temperature wa	as inappropriate (i.e., <	f sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or			
	temperature is outside	e the range 0° (but not f	rozen) to 10° flag all p	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds	comperature exceeds 10°, flag positive detections "J" and non-detects "R".	ions "J" and non-detec	ts "R".			
2.2	Have any technical he	olding times, determine	d from sampling to dat	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).	×		
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical ho	olding times been gross	ly (twice the holding ti	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	

Note: Several samples were analyzed outside holding times. Qualifications are listed below.

	Field ID	Analyte	Qualification	Days late	Code
All VOCs All VOCs All VOCs All VOCs	SA-Q-6-WS-16	All VOCs	J/UJ		Н
All VOCs All VOCs	AT-Q-31-WS-12	All VOCs	J/UJ	5	H
Ali VOCs Ali VOCs	SA-Q-3-WS-12	All VOCs	J/UJ	5	H
All VOCs	AT-Q-28-WS-16	All VOCs	J/UJ	5	i ±
	SA-0-1-SB-3	All VOCs	J/UJ	v.	=

3.0 GC/MS Instrument Performance Check (Code T)

		Yes	N ₀	ŇĀ
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			×
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no. flag R.			,
	D			×
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no. flag R			
				×

4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	No	NA
4.1	Is a Method Blank Summary form present for each batch?	×		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	×		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
	[butanone] the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
	"J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			l

The method blank had detections of methylene chloride above the MDL. Qualifications are listed below. Note:

-	Code 7	1 /	7 /	7	Z	Z					Z	Z	1
	24					54					1		
Ouslification			n	n	ח	n	n	n	n	n	ח	ם	
Analyte	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride	Methylene chloride
Field ID	SA-Q-6-WS-16	AT-Q-28-WS-16	SA-0-4-SB-6	AT-Q-25-WS-9	SA-P-2-WS-9	AT-Q-31-WS-12	SA-0-1-SB-3	SA-0-2-WS-9	SA-P-1-WS-8	SA-Q-3-WS-12	SA-0-3-WS-9	SA-0-2-WS-9-D	SA-P-3-WS-14

5.0 GC/MS Initial Calibration (Code C)

		Yes	ŝ	Y Z
5.1	5.1 Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			: ×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders			
	like ketones or alcohols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			*
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			
		_		

Note:

6.0 Continuing Calibration (Code C)

		Yes	N ₀	NA
6.1	Are Continuing Calibration Summary forms present and complete?			*
6.2	Has a continuing calibration standard been analyzed every 12 hours?			* *
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			 -
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			*
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			*
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	S.	AN
7.1	Are all sample	es listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Form?	4		
7.2	Are surrogate	Are surrogate recoveries within acceptan	acceptance criteria specified in the OAPP for all samples?	PP for all samples?	,		i
7.3	If No in Section	If No in Section 7.2, were these sample(s	sample(s) or method blank(s) reanalyzed?	¿pe	4		,
7.4	If No in Section	on 7.3, is any sample dilutic	on factor greater than 10? (Su	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out)			¥ :
	Note: If CMC	Note: If CMC "socresion do not most		of the control of the			×
	INOTE: II SINIC	recoveries do not meet act	ceptance criteria in samples ch	timeet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	equired.					
		> ncr	10% to LCL	<10%			
	Positive	ſ	J	ſ			
	Non-detect	None	UJ	2			

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		Yes	S _o	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other OC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

Noto:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	°Z	A A
9.1	Is an LCS recovery form present?	×		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?			
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	*		
9.4	If Level IV, verify the % recoveries are calculated correctly.	•		
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; $<$ LCL, $J(+)/UJ(-)$; $<$ 10% $J(+)/R(-)$. RPD failures should be flagged "J" $(+$ only)			
		_	_	

Note:

10.0 Internal Standards (Code I)

					Yes	No	ΑN
10.1	Are internal stand	Are internal standard areas for every sample and blank within upper and lower QC limits?	id blank within upper and lo	wer QC limits?			
		Area > +100%	Area < -50%	Area < -10%		i	
	Positive	<u></u>	ſ	ſ			
	Non-detect	None	ſſ	8			
	The method speci	fication is for the continuing	calibration to be compared	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibration. Thus, if	tion. Thus, if all other QC sp.	ecifications are met for a giv	all other QC specifications are met for a given sample, using informed professional judgment.			
	the reviewer may	the reviewer may choose not to flag individual samples in this case.	samples in this case.				
10.2	Are retention time	Are retention times of internal standards within 30 seconds of the associated calibration standard?	30 seconds of the associate	d calibration standard?			
	Action: The chron	matogram must be examined	to determine if any false po	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the rev	iewer may consider partial or	r total rejection of the data	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction			

11.0 TCL Identification (Code W)

		x es	0	¥Z
-	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
11.1	Calibration?			×
11.3	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
11.2	do sample and standard relative ion intensities agree within 30%?			×

12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	°Z	NA
12.1	Are RLs used consistent with those specified in the QAPP?			×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			*
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			
MI-4-:				

Note:

13.0 Field Duplicate Samples (Code F)

		x es	xes No NA	¥.
13.1	Were any field duplicates submitted for VOC analysis?	×		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		*	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		•	
Note:	Sample SA-O-2-WS-9 was the parent sample of SA-O-2-WS-9-D. %RPD values were outside OC limits. On alifications are listed below	listed helow		

Sample SA-O-2-WS-9 was the parent sample of SA-O-2-WS-9-D, %RPD values were outside QC limits. Qualifications are listed below.

Code	Ţ	<u></u>	ŢĽ	Ιτ	Ĭ.	Ţ	Ţ	Ĭ.	Į.	L
Qualification	ſ	Ţ	ſ	ſ	Ţ	ſ	ſ	ſ	Ţ	, , , , , , , , , , , , , , , , , , ,
Analyte	Benzene	Toluene	Chlorobenzene	Ethylbenzene	Xylenes, Total	Benzene	Toluene	Chlorobenzene	Ethylbenzene	Xvlenes Total
Field ID	SA-O-2-WS-9	SA-O-2-WS-9	SA-O-2-WS-9	SA-O-2-WS-9	SA-0-2-WS-9	SA-O-2-WS-9-D	SA-O-2-WS-9-D	SA-O-2-WS-9-D	SA-O-2-WS-9-D	SA-O-2-WS-9-D

14.0 Data Completeness

		Yes	0N	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	×		
14.2	Number of samples:			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)			
	% Completeness 100			

8/8/2006

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Project Name: Bart Brandenburg Reviewer: Date:

9/9/2005 Severn Trent Laboratory - Savannah

Laboratory

Project Number: SDG No.:

Review Level:

Sauget - Area 2 21561510.60011 SAS 026 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on surrogate and internal standard recoveries.

Field IDs: SA-Q-6-WS-16

AT-Q-28-WS-16

SA-0-4-SB-6

AT-Q-31-WS-12 SA-0-1-SB-3 SA-O-2-WS-9

SA-Q-3-WS-12 SA-O-3-WS-9

> AT-Q-25-WS-9 SA-P-2-WS-9

SA-O-2-WS-9-D SA-P-3-WS-14

SA-P-1-WS-8

1.0 Chain of Custody/Sample Condition

¥ ž Yes × Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data? Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained? Do Chain-of-Custody forms list all samples analyzed? 1.3 1.2

Note: The surrogates and internal standards had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

		Yes	Yes No NA	NA A
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (>			
	10° C), then flag all positive results with a "J" and all non-detects "UJ".			
. , ,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
7:7	Table for sample holding time) If yes, J(+)/UJ(-).	×		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	×		
			COLD GEORGA, PROPERTY OF A STATE OF THE STAT	

Note: All samples were re-extracted 25 days outside of holding time. The original analyses will be used.

3.0 GC/MS Instrument Performance Check (Code T)

		X es	ON	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			Х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Š

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		?	2	
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?	20.00	X	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the			
	detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		x es	Yes NO NA	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

6.0 Continuing Calibration (Code C)

		I es	0 1	¥Z.
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
.6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	%	NA
7.1	Are all sampl	Are all samples listed on the appropriate Sur	opriate Surrogate Recovery Summary Form?	orm?	X		
7.2	Are surrogate	recoveries within acceptance c	riteria specified in the QAPP	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		×	
7.3	Are more than	Are more than one of either fraction outside the acceptance criteria?	the acceptance criteria?		×		
7.4	If Yes in Secti	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	method blank(s) reanalyzed?			×	
7.5	If Yes in Secti	If Yes in Section 7.3, is any sample dilution	le dilution factor greater than 10?			,	
	Note: If SMC	Note: If SMC recoveries display unacceptab	le recoveries in the MS and/	unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and			
	acids and base	acids and base/ neutrals are assessed separately.	ely.				
		> UCL 10%	10% to LCL	< 10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	UJ	R			

Several samples had surrogate recoveries below QC limits. Qualifications are listed below. Surrogate recoveries can be submitted upon request as needed.

epo)	S	S	S	S	S	S	S	S	S	S	S
Qualification	J/UJ	tU\t	J/UJ	J/UJ	J/UJ	J/UJ	J/UJ	J/UJ	J/UJ	J/UJ	J/UJ
Analyte	All Acid/fraction SVOCs	All Acid/fraction SVOCs	All Acid/fraction SVOCs	All Acid/fraction SVOCs	All Acid/fraction SVOCs	All SVOCs	All SVOCs	All Acid/fraction SVOCs	All SVOCs	All Acid/fraction SVOCs	All Acid/fraction SVOCs
Field ID	SA-Q-6-WS-16	SA-Q-6-WS-16RE	SA-Q-3-WS-12	SA-Q-3-WS-12-RE	AT-Q-28-WS-16RE	AT-Q-25-WS-9	SA-P-1-WS-8	SA-P-1-WS-8RE	SA-P-3-WS-14	SA-P-3-WS-14RE	SA-P-2-WS-9RE

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		~~~		1 :: 1
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			×
-	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

Note

# 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No NA	A V
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	X		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

#### 10.0 Internal Standards (Code I)

					3	100	V.
10.1	Are internal stand	ard area of every sample and bla	nk within upper and lower	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?		x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	ſ	ſ	J			
	Non-detect	None	UJ	R			
	The method specil	fication is for the continuing calil	ration to be compared to the	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibra	tion. Thus, if all other QC specif	ications are met for a giver	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,			
	the reviewer may	he reviewer may choose not to flag individual sam	individual samples in this case.				
10.2	Are retention time	Are retention times of internal standards within 30 seconds of the associated calibration standard?	seconds of the associated c	alibration standard?	×		
	Action: The chron	natogram must be examined to d	etermine if any false positi	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the rev	iewer may consider partial or tol	al rejection of the data for	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note: Several samples had internal standards outside QC limits. Qualifications are listed below.

Code	I	I	I	I	I	ı	I	I	П	1
IS Recovery High/Low	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Qualification	ľΩ/ſ	fΩ/f	lU/l	J/UJ	J/UJ	IU/I	J/UJ	J/UJ	J/UJ	J/UJ
Analyte	All SVOCs	All SVOCs	All SVOCs	All SVOCs	All SVOCs	All SVOCs	All SVOCs	All SVOCs	All SVOCs	All SVOCs
Field ID	SA-0-1-SB-3	SA-0-2-WS-9	SA-0-2-WS-9-D	AT-Q-25-WS-9	SA-P-1-WS-8	SA-P-3-WS-14	SA-Q-6-WS-16	SA-O-3-WS-9	SA-Q-3-WS-12	AT-Q-28-WS-16

#### 11.0 TCL Identification (Code W)

11.1 Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?  Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			Yes	ž	AN
Cautoration? Are the three ions of greatest intensity sample and standard relative ion intens	11.1	e (RRT) of each			•
Are the three ions of greatest intensity sample and standard relative ion intens		calibration?			<
sample and standard relative ion intens	11 2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do			
	711.7	ens			×

# 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

12.1 Are these limits adjusted to reflect dilutions and/ or percent solid.  12.2 Are these limits adjusted to reflect dilutions and/ or percent solid.  12.3 Are TIC ions greater than ten percent in the reference spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the following spectrum and the followin			
12.2 Are these limits adjusted to reflect dilutions and/ or percent solid.  12.3 Are any positives reported that the percent in the reference spectrum a	specified in the QAPP?		×
12.3 Are TIC ions greater than ten percent in the reference spectrum a	illutions and/ or percent solids as required?		×
1) 1 A A so on the capture to the thort source and	nt in the reference spectrum also present in the sample spectrum?		×
12:4 Tric any positives reported that exceed the linear range of the line	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
12.5 If Level IV, calculate a sample of positive results to verify correct calculations	ositive results to verify correct calculations		

Note:

#### 13.0 Field Duplicate Samples (Code F)

		Yes	ž	N A
13.1	Were any field duplicates submitted for SVOC analysis?	Х		
13.2	Were all RPD or absolute difference values within the control limits?	×		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			
Note:	Sample SA-O-2-WS-9-D was submitted as the duplicate sample of SA-O-2-WS-9.		_i	

#### 14.0 Data Completeness

			res	IND	NA.
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	e, 90% for soil sample)	X		
14.2	Number of samples:	13			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 x 14.2) - 14.3) / (14.1 x 14.2)				
	% Completeness	100			

#### DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Project Number: Project Name: Bart Brandenburg 9/8/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah Laboratory

21561511.60011 Sauget - Area 2 SAS 026 Level III

Review Level:

SDG No.:

Major Anomalies:

No samples were rejected.

#### Minor Anomalies:

Field IDs:

Samples were qualified based on LCS and surrogate recoveries, and on method blank contamination.

SA-Q-3-WS-12 AT-Q-31-WS-12 SA-0-1-SB-3 AT-Q-28-WS-16 SA-Q-6-WS-16 SA-O-4-SB-6

SA-O-2-WS-9 SA-P-1-WS-8

SA-O-2-WS-9-D SA-P-3-WS-14 SA-O-3-WS-9

SA-P-2-WS-9

AT-Q-25-WS-9

## 1.0 Chain of Custody/Sample Condition

			7.0	T.
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			
L.1	samples, analytical problems or special circumstances affecting the quality of the data?	×		
		2	S. C. C. C. C. C. C. C. C. C. C. C. C. C.	

The laboratory case narrative indicated that the LCS and surrogate recoveries were outside QC limits Note:

The narrative also indicated that the method blank had detections above the MDL.

## 2.0 Holding Time/ Preservation (Code H)

		2 2	- 9 1	Y.
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
C	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7.7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	;

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

			 0 2	<b>V</b>
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results (TCL)?	×		
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		×	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The PCB method blank had detections above the MDL. Qualifications are listed below.

	1
Code	×
New RL	-
Qualification	U
Analyte	Tetrachlorobiphenyl
Field ID	SA-O-4-SB-6

# 4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	AZ OZ	Y Z
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			×
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			<b> </b>
				Α.
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			X
		CANADAM CONTRACTOR		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

#### 5.0 Initial Calibration (Code R)

		X es	2°	Z Z
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			*
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			:   ;
				X
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
53	If Level IV recalculate a cample of RRRs and & RCDs to warift, noweast coloniations and Latin Land			
	de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de la company de			

Note:

#### 6.0 Continuing Calibration (Code C)

		Yes	2	<b>∀</b> Z
6.1	Are Continuing Calibration Summary forms present and complete?			<b>×</b>
6.2	Has a continuing calibration standard been analyzed every 12 hours?			*   >
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?			* ×
	If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For $\%D > 50\%$ , flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

#### 7.0 Surrogate Recovery (Code S)

					Yes	No No	NA
7.1	Are all sample	s listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	nary Form ?	*		
7.2	Are surrogate	recoveries within acceptan	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	OAPP for all samples?		,	
Ċ						٧	
7.3	II No in Section	on 7.2, were these sample(	II No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	lyzed?			*
							٧
4.7	II No in Section	on 7.3, is any sample diluti	ion factor greater than 10?	II No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		1717					:
		> UCL	10% to LCL	<10%			
-	Positive	J	ſ	ſ			
	1						
	Non-detect	None	Û	R			

Several samples had surrogate recoveries outside QC limits. Qualifications are listed below. Note:

Field ID	Surrogate	Surrogate Recoveries	Surrogate Limits
SA-0-1-SB-3	DCB-Decachlorobiphenyl	14	30-150
AT-Q-25-WS-9	DCB-Decachlorobiphenyl	8	30-150
SA-P-1-WS-8	DCB-Decachlorobiphenyl	15	30-150
SA-P-3-WS-14	DCB-Decachlorobiphenyl	16	30-150
SA-P-2-WS-9	DCB-Decachlorobiphenyl	14	30-150

Field ID	Analyte	Qualiffeation	Code
SA-0-1-SB-3	All Pesticides	l/UJ	S
AT-Q-25-WS-9	All Pesticides	J/UJ	S
SA-P-1-WS-8	All Pesticides	I/UJ	S
SA-P-3-WS-14	All Pesticides	J/UJ	S
SA-P-2-WS-9	All Pesticides	J/UJ	S

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		E E	0	N.
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
	A MCM CD			
۵,	Are IND/IND analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each			
7.0	matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other			
	QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10%			

Note:

# 9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Xes	ŝ	Y Z
9.1	Is an LCS recovery form present?	×		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	<b>4</b>		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		<b>*</b>	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
Note:	The LCS had recoveries outside the OC limits. Oualifications are listed below			

The LCS had recoveries outside the QC limits. Qualifications are listed below.

LCS/LCSD Limits	40-123	
LCS/LCSD Recoveries	28/31	
Analyte	Endosulfan II	
TCS ID	LCS 680-13860	

		_	<del></del>				_			-		-	
Code	L	T	1	T	1	Γ	L	ı	L	T	L	T	T
Qualification	UJ	UJ	m	m	UJ	UJ	UJ	U	m	m	U	m	UJ
Analyte	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II	Endosulfan II
Field ID	SA-Q-6-WS-16	AT-Q-28-WS-16	SA-0-4-SB-6	AT-Q-25-WS-9	SA-P-2-WS-9	AT-Q-31-WS-12	SA-0-1-SB-3	SA-O-2-WS-9	SA-P-1-WS-8	SA-Q-3-WS-12	SA-O-3-WS-9	SA-O-2-WS-9-D	SA-P-3-WS-14

#### 10.0 TCL Identification (Code W)

	*	!
2		
	10.1 Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the	Community Canolandii:
	-	

Note:

# 11.0 TCL Quantitation and Reported Detection limits (Code P)

, ,		20.0		# 7 . T
11.1	Are RLs used consistent with those specified in the QAPP?			×
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			*
;				
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			*
				¥
11.4	If Level 1V, calculate a sample of positive results to verify correct calculations		-	

## 12.0 Field Duplicate Samples (Code F)

		ŝ	2	NA.
12.1	Were any field duplicates submitted for analysis?	X		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	x		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample SA-O-2-WS-9-D was submitted as the duplicate sample to SA-O-2-WS-9.

#### 13.0 Data Completeness

		Xes	No	A A
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil			
1.61	sample)	×		
13.2	Number of samples:			
13.3	Number of target compounds in each analysis:			
13.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			
	% Completeness 100			

#### DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Bart Brandenburg 9/8/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah

21561510.60010 Sauget - Area 2

Project Number: Project Name:

Review Level:

SDG No.:

SAS 026 Level III

Major Anomalies:

Laboratory

No samples were rejected

#### Minor Anomalies:

Samples were qualified based on surrogate recoveries.

AT-Q-28-WS-16 SA-Q-6-WS-16 Field IDs:

SA-O-2-WS-9 SA-0-1-SB-3

AT-Q-31-WS-12

SA-O-2-WS-9-D SA-Q-3-WS-12 SA-O-3-WS-9

AT-Q-25-WS-9

SA-O-4-SB-6

SA-P-1-WS-8

## 1.0 Chain of Custody/Sample Condition

1.1	Do Chain-of-Custody forms list all samples analyzed?	×	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×	
1.2	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of		
C.1	samples, analytical problems or special circumstances affecting the quality of the data?	×	•
Note:	The laboratory case narrative indicated that the surrogates had recoveries outside the OC limits.		

The laboratory case narrative indicated that the surrogates had recoveries outside the QC limits.

## 2.0 Holding Time/ Preservation (Code H)

		x es	0 Z	<b>V</b>
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		*	
		330		

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		3		V
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		×	i
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.	_		
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

#### 4.0 Initial Calibration (Code R)

		Yes	- 2	A V
4.1	Are Initial Calibration summary forms present and complete for each instrument used?		:	×
				:
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			*
				*
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

### 5.0 Continuing Calibration (Code C)

		Yes	N _o	Y Y
5.1	Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 12 hours?			×
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $< 20\%$ )?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.5	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			-

Note:

#### 6.0 Surrogate Recovery (Code S)

					Yes	2 Z	₹ Z
6.1	Are all sampl	es listed on the appropria	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	y Form?	Ж		
6.2	Are surrogate	Are surrogate recoveries within acceptance c	ance criteria specified in the QAPP for all samples?	APP for all samples?	×		
6.3	If No in Secti	If No in Section 6.2, were these sample(s) or	e(s) or method blank(s) reanalyzed?	ed?			×
6.4	If No in Secti	If No in Section 6.3, is any sample dilution fi	ition factor greater than 10? (Su	factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> OCL	10% to LCL	<10%			
	Positive	J	ſ	, in the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second			
	Non-detect None	None	UJ	R			

One sample had surrogate recoveries outside QC limits. Qualifications are listed below. Note:

Surrogate Limits	35-134
Surrogate Recoveries	28
Surrogate	DCAA
Field ID	AT-Q-28-WS-16

Code	S
Qualifications	I/UJ
Analyte	All Herbicides
Field ID	AT-Q-28-WS-16

		Yes	ŝ	N A
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	110	×	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

Note:

# 8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		3	011	
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, 1(+) only; <lcl, "j"="" (+="" 1(+)="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
	ш			

Note:

#### 9.0 TCL Identification (Code W)

	Yes	No	NA
ative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
calibration?			×

# 10.0 TCL Quantitation and Reported Detection limits (Code P)

		153	ONT	<b>1</b>
10.1	Are RLs used consistent with those specified in the QAPP?			×
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			X
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

## 11.0 Field Duplicate Samples (Code F)

		ទ	2	A.
11.1	Were any field duplicates submitted for herbicide analysis?	X	:	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Sample SA-O-2-WS-9-D was submitted as the duplicate for sample SA-O-2-WS-9.

#### 12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	ample, 90% for soil	X		
12.2	Number of samples:	1			
12.3	Number of target compounds in each analysis:	0			
12.4	Number of results rejected and not reported:				
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	001			

#### 8/7/2006

#### DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Sauget - Area 2 21561510.60011 SAS 026 Level III Project Number: Project Name: Review Level: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 9/9/2005 Laboratory Reviewer: Date:

Major Anomolies:

No samples were rejected

#### Minor Anomolies:

Field IDs:

Samples were qualified based method blank contamination, and hold time criteria.

SA-Q-3-WS-12	SA-O-3-WS-9	SA-0-2-WS-9-D	SA-P-3-WS-14	
AT-Q-31-WS-12	SA-0-1-SB-3	SA-O-2-WS-9	SA-P-1-WS-8	
SA-Q-6-WS-16	AT-Q-28-WS-16	SA-O-4-SB-6	AT-Q-25-WS-9	SA-P-2-WS-9

## 1.0 Chain of Custody/Sample Condition/Raw Data

CVAA-Hg

GFAA

ICP-MS

ICP

		Yes	N _N	A Yes	%	NA Y	Yes No NA Yes No NA Yes No NA Yes No NA	NA	Yes	2	ΑĀ
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	X							ж	╁	Γ
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×							×	+	
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×								×	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4  ^{\circ}$ C + $2  ^{\circ}$ C)	×							×		T
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete x documentation, contact the laboratory for explanation/resubmittal	×							*		<del></del>
Note:	The laboratory case narrative indicated that the method blank had detections above the MDL, and that mercury was analyzed outside hold time criteria	that me	rcury	was ana	lyzed o	untside	hold tim	e criter	2.6	$\parallel$	1

The laboratory case narrative indicated that the method blank had detections above the MDL, and that mercury was analyzed outside hold time criteria

#### 2.0 Holding Time (Code H)

		Yes ]	No NA Yes	s No	NA Yes	No N	NA Yes	%	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been	13000							
7:7	exceeded? (Hg. 28days, other metals: 6 months) See attached Holding Time Table.	80 A	×				×		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)			-					T
	I(+)/B(-)								

CVAA-Hg

GFAA

ICP-MS

ICP

Note: Holding times for mercury were outside QC limits. Qualifications are listed below.

Field TD	Analytes	Qualification	Days late	Code
SA-Q-6-WS-16	Mercury	UJ	12	H
AT-Q-31-WS-12	Mercury	U	12	Н
SA-Q-3-WS-12	Mercury	U	12	Н
AT-Q-28-WS-16	Mercury	UJ	12	Н
SA-0-1-SB-3	Mercury	J	12	Н
SA-O-3-WS-9	Mercury	J	12	Н
SA-0-4-SB-6	Mercury	ſ	12	Н
SA-O-2-WS-9	Mercury	UJ	12	H
SA-O-2-WS-9-D	Mercury	U	12	Н
AT-Q-25-WS-9	Mercury	UJ	12	Н
SA-P-1-WS-8	Mercury	UJ	12	Н
SA-P-3-WS-14	Mercury	UJ	12	Н
SA-P-2-WS-9	Mercury	UJ	12	Н

#### 3.0 Instrument Calibration (Code C)

						ICP	IC	ICP-MS		GFAA		CVAA-Hg	H.
					Yes	No NA Yes		No N	No NA Yes	No NA Yes	A Yes	% N	NA
3.1	Are sufficient standards included in the GFAA: blank + three standards; CVAA:	the calibration curve? (ICP AA: blank + five standards)	?? (ICP/ICP-MS: b)	calibration curve? (ICP/ICP-MS: blank + one standard; blank + five standards)		×		_					
3.2	Are the correlation coefficients > 0.995?	95? (for GFAA and	(for GFAA and CVAA) Action: J(+)/UJ(-)	+)/UJ(-).				<u> </u>					×
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	n (ICV) analyzed at t letermine affect on th	the beginning of eac e data and note in r	ch analysis? Action: eviewer narrative.		×		· ·				Secretar 21. Z	×
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	tion (CCV) performe : If no, use professio	ed every 10 analysional judgment to det	is or every 2 hours, termine affect on the		×							×
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	nt recoveries (ICV atals (90%-110%).	and CCV) within	the control limits?		x							×
	Action: R(+/-)	J(+)/UJ(-)	J(+)	R(+)						2 220		0/8	
	Mercury < 65%	65% - 79%	121% - 135%	> 135%									
j	Other Metals < 75%	75% - 89%	111% - 125%	> 125%		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

CVAA-Hg

GFAA

ICP-MS

ICP

		Yes	%	No NA Yes No NA Yes No NA Yes	ž	$\frac{1}{N}$	Yes	No.	VA Ye	s No	NA	- -
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, ner matrix and ner level)?	×								×		Ť
	,		1			-			13			1
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are					(SA)					9402	
!	determined for positive and negative blank values.	×						, .		×	775sa	
43	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to											T
2:	determine affect on the data note in reviewer narrative.	×										
	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours		T			$\perp$					ļ	Т
4.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on the	×								_		
	data to note in reviewer narrative.											
4 5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank			-		1886			-			T
? ·	value are determined for positive and negative blank values.	×								×	14.18.825	
46	Are there samples with concentrations less than five times the highest level in associated blanks?								+	+		Т
ř	Action: If yes, U at reported concentration.		×			2000 La				×		
47	Are there samples with non-detect results or with concentrations less than five times the most								+			T
/::	negative value in associated blanks? Action; If yes, J(+)/UJ(-).		×			eya ti				×		
Note:	Oversial Learnest Later 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and 1 and								╢			٦
Note:	Several target analyte values were detected above the IDL. Qualifications are listed below.											Ì

Field ID	Analyte	Qualification	New RL	Code
SA-Q-6-WS-16	Aluminum	Ω	•	Ь
SA-Q-6-WS-16	Copper	Ŋ	•	Ь
SA-Q-6-WS-16	Selenium	Ω	•	Ь
AT-Q-31-WS-12	Aluminum	Ω	280	Ь
AT-Q-31-WS-12	Copper	Ω	•	Ь
AT-Q-31-WS-12	Selenium	n	1	Ь
SA-Q-3-WS-12	Copper	Ω	•	Ь
SA-Q-3-WS-12	Selenium	Ω	ř	Ь
AT-Q-28-WS-16	Selenium	Ω		P
SA-0-1-SB-3	Selenium	Ŋ	16	P
SA-O-3-WS-9	Aluminum	Ŋ	210	Ь
SA-0-3-WS-9	Selenium	n	24	Р
SA-O-4-SB-6	Selenium	n	3	Ь
SA-O-2-WS-9	Copper	n	1	P
SA-0-2-WS-9	Selenium	n		P
SA-O-2-WS-9-D	Aluminum	Ω	310	P
SA-O-2-WS-9-D	Copper	U	•	ď
AT-Q-25-WS-9	Aluminum	n	310	P
AT-Q-25-WS-9	Copper	n		Ъ
AT-Q-25-WS-9	Selenium	Ω	1	P
SA-P-1-WS-8	Aluminum	n	230	P
SA-P-1-WS-8	Copper	n	•	Ь
SA-P-1-WS-8	Selenium	U		P
SA-P-3-WS-14	Aluminum	Ω	210	P
SA-P-3-WS-14	Copper	Ω	•	P
SA-P-2-WS-9	Copper	Ω	-	P
SA-P-2-WS-9	Selenium	U	•	Ь

Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?  3.2 Are the ICS AB recoveries within 80% - 120%?  3.3 Are the results for unspiked analytes (in ICS A) < + IDL?  3.4 If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?  3.5 Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)  3.6 Action: Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)  3.7 Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)  3.8 Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action									ICP		ICP-MS	SI	E	GFAA	L	CVAA-Hg	-Hg
Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?  Are the ICS AB recoveries within 80% - 120%?  Are the results for unspiked analytes (in ICS A) < + IDL?  If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?  Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)  Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)  C-IDL > IDL < 50% 50% - 79% > 120%  UJ(-) I(+) R(+/-) I(+) I(+) I(+) I(+) I(+)								Yes	No N	IA Ye	s No	NA 1	es 1	Vo NA	A Yes	ž	NA
beginning or once every 8 hours (whichever is more frequent) for ICP-MS?  Are the ICS AB recoveries within 80% - 120%?  Are the results for unspiked analytes (in ICS A) < + IDL?  If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?  Action: Not Spiked Analytes Spiked analytes (ICS AB analytes) <p>Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)  Action: Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)  Action: Action: Action: Spiked Analytes Spiked analytes (ICS AB analytes)  Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action: Action:</p>	5.1	Was ICS A	B analyzed a	ut beginning of ea	ch ICP run (or	at least twice ever	y 8 hours), and at the							_		-	L
Are the ICS AB recoveries within 80% - 120%?  5.3 Are the results for unspiked analytes (in ICS A) < + IDL?  5.4 If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?  Action: Not Spiked Analytes Spiked analytes (ICS AB analytes) <ul> <li><a href="https://linewidth.com/">x</a></li> <li>Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)</li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li>Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)</li> <li><a href="https://linewidth.com/">x</a></li> <li>Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)</li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li><a href="https://linewidth.com/">x</a></li> <li></li></ul>																	

Note:

# 6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

								ICF	_	ICF-MS	2	GFA	GFAA	2	CVAA-Hg	ත
							Yes	No	A Yes	No	NA Ye	Yes No NA Yes No NA Yes No NA Yes No NA	NA	Yes	  2	ΝΑ
6.1	Was an LC	S prepared and	d analyzed at th	e correct frequ	ency (one per 20	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per	,						1331,333	A		
	matrix and	per level)? Ac	matrix and per level)? Action: It no, J(+)	) any sample no	any sample not associated with LCS results.	LCS results.				3888		e, o		4		
62	Is any LCS	recovery outs.	ide the control i	limits? (Aquec	ous limits: 80% -	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and										
?!	Sb; Solid lii	nits: as per EP	Sb; Solid limits: as per EPA-EMSL/LV)					X							×	_
	Action:	So	Solid		Aqueous					i e i						
		< CCL > UCL	> UCL	< 50%	50% - 79% > 120%	> 120%			_		-					ŀ
		J(+)/UJ(-)	)(+)	R(+/-)	(+)/(1)(-)	J(+)			_							Γ
							1	2000	-	200000000000000000000000000000000000000				24		-

Note:

### 7.0 Laboratory Duplicates (Code K)

		Yes	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	Yes	<u>z</u> %	A Yes	No.	VA Yes	å	NA
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	×						×		
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		×						×	
7.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for aqueous, and RPD $< 35\%$ or difference $< \pm 2$ X PQL for solids) Action: If no, J(+).		×							×
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.				-				20 20 20 20	

CVAA-Hg

GFAA

ICP-MS

ICP

Note: The laboratory dulicate was not a sample in this SDG.

# 8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

						ICP	ا ہے ا	I	ICP-MS		GFAA		CVAA-Hg	A-Hg	50
					Ϋ́	Yes No	No NA Yes		No	No NA Yes	No NA Yes	NA		No NA	Α̈́
	Was a spik	ced sample prepare	d and analyzed at the corre	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per	i, per									$\vdash$	
8.1	batch, per	batch, per matrix and per level)? Action:	el)? Action: If no, J(+), wi	If no, J(+), with professional judgment, analytes not	s not	×					F 4 1 2 5				
	associated	associated with matrix spike results.										33: 1			
83	Was a field	d blank used for the	e MS analysis? Action: If	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment.	nent.										
7.0	Note in worksheet.	rksheet.					×		i.						×
	Note: Mat	rix spike analysis	may be performed on a fie	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous	snoa		98.					İ			
	sample in an SDG.	ın SDG.		•											
	For all anal	lytes with sample c	oncentration $< 4 \times \text{spike cor}$	For all analytes with sample concentration $< 4 \times \text{spike}$ concentration, are spike recoveries within	ithin	100								H	
8.3	the control	limit of 75-125%	? (No control limit applies	the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x	. 4 x		×				<b>*</b>	<u></u>			<b>×</b>
	spike concentration.)	entration.)									: 25i				
		R > 125%	30% < %R < 74%	%R < 30%			_							├-	
	Positive	J	ſ	J										┡	
	Non-detect	None	UJ	R							DAY.				

Note:

### 9.0 Instrument Detection Limits (IDL)

		C	<u> </u>	ICP-MS	GFAA		CVAA	A-Hg
	X.	es	o NA Yes	No NA	Yes No	NA Ye	N ₀	NA
Are all IDL equal to or less than the reporting limits specified?			х					×

9.1 Note:

### 10.0 ICP Serial Dilutions (Code S)

		Yes	Yes No NA Yes No NA Yes No NA Yes No NA	No	JA Ye	N	NA	Yes	ž	ĄZ
				_				-	?	4 : :
10.1	Were serial dilutions performed?	×			_	_				
								_		
10.2	Was a five-fold dilution performed?	×		Day (v.				Г	$\vdash$	
		1							_	
103	Did the serial dilution results agree within 10% for analyte concentration $> 50 \times 10^{-5}$ the IDL in the								-	
20.7	original sample? If no, J(+).	×		3.20						
					1					
Note:	Samples SA-Q-6-WS-16, SA-Q-3-WS-12, and SA-P-3-WS-14 were diluted and analyzed, all %Ds were within OC limits	S were	within OC lim	ife						

CVAA-Hg

ICP-MS

ICP

Samples SA-Q-6-WS-16, SA-Q-3-WS-12, and SA-P-3-WS-14 were diluted and analyzed, all %Ds were within QC limits.

### 11.0 Field Duplicate Samples (Code F)

			ICP		ICP-MS		GFAA	A	CV.	CVAA-Hg	Ig
		Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA	No	VA Ye	s No	NA	Yes	ŝ	NA
11.1	Were any field duplicates submitted for metal analysis?	X	-						×		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$ )	×	<u> </u>						¥		

Sample SA-O-2-WS-9-D was submitted as the duplicate for sample SA-O-2-WS-9 Note:

### 12.0 Result Verification (Code Q)

		Ι	ICP	IC	ICP-MS		GFAA		CA/	CVAA-Hg	50
		Yes	Yes No NA Yes No NA Yes No NA Yes No NA	Yes	N _o N	A Yes	ο̈́χ	NA	(es	9	ΙŽ
2.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?		×				1,0				×
12.2	Were all dilution reflected in the positive results and detection limits?		×					12.438		H	×
Note:	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s									1	#

#### 13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for					
1.0.1	aqueous sample, 90% for soil sample)					
13.2	Number of samples:	13	L	I.	0	13
13.3	Number of target compounds in each analysis:	22	L_	<u> </u>	0	1-
13.4	Number of results rejected and not reported:	0	L	T _o	0	0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)			Γ		
	% Completeness	100	<u> </u> #	#	####	100

#### DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Project Number: Project Name: Severn Trent Laboratory - Savannah Bart Brandenburg 9/8/2005 Laboratory Reviewer: Date:

Ammonia 350.1

Review Level: SDG No.:

21561510.60011 Sauget - Area 2 SAS 026 Level III

Major Anomalies:

Method No.:

Test Name:

No samples were rejected

Minor Anomalies:

Samples were qualified based on blank contamination.

AT-Q-31-WS-12 SA-Q-6-WS-16 Field IDs:

SA-P-2-WS-9

AT-Q-25-WS-9 SA-O-4-SB-6

SA-0-2-WS-9-D

SA-O-2-WS-9 SA-P-1-WS-8

SA-0-1-SB-3

AT-Q-28-WS-16

SA-P-3-WS-14

SA-Q-3-WS-12 SA-O-3-WS-9

## 1.0 Chain of Custody/Sample Condition

		Yes	°Z	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×		
Note:	The laboratory case narrative indicated that the method blank had detections above the MDL.			

The laboratory case narrative indicated that the method blank had detections above the MDL.

## 2.0 Holding Time/ Preservation (Code H)

		3	2	Į.
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
Ċ	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Y es	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?	×		
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.		-	
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL. Qualifications are listed below.

Code	Z
New RL	
Qualification	Ω
Analyte	Ammonia
Field ID	SA-P-3-WS-14

### 4.0 Initial Calibration (Code C)

		1.03	WAI ONI	ZVI
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

### 5.0 Continuing Calibration (Code R)

		3	2	4717
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			x
5.3	Do any analytes have a %R outside QC limits (80-120%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.		·	
5.4	If Level IV, calculate a sample of %Rs.			

Note:

# 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		res	ON	Y V
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may		·	
	require rejection. RPD failures may be flagged "J" (+ only)			

Note:

# 7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Y es	res No	A V
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	×		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

8/7/2006

### 8.0 Analyte Identification

		I es	ONI	NA
0 1	d (if applicable) within 0.06 RRT units of the standard RRT i	П		
0.1	the continuing calibration?			×

Note:

## 9.0 Analyte Quantitation and Reported Detection limits

9.1	Are RLs used consistent with those specified in the QAPP?		×
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
9.4	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

### 10.0 Field Duplicate Samples (Code F)

		I es	0 N	NA
10.1	Were any field duplicates submitted?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Sample SA-O-2-WS-9-D was submitted as the duplicate for sample SA-O-2-WS-9.

Note:

8/7/2006

### 11.0 Laboratory Duplicates (Code K)

		Ics	ONT	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X	
11.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for aqueous, and RPD $< 35\%$ or difference $< \pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are $> 5$ X IDL.			×

Note: The laboratory duplicate analyzed was from a different client.

### 12.0 Data Completeness

			res	0N	NA V
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	us sample, 90% for soil	X		
12.2	Number of samples:	13			
12.3	Number of target compounds in each analysis:	1			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100			

		•

#### DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Bart Brandenburg 10/5/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah

Laboratory

Sauget - Area 2 Project Name:

21561510.60011 SAS 027 Level III

Review Level:

Project Number:

SDG No.:

Minor Anomalies:

No samples were rejected

Major Anomalies:

Samples were qualified based on method blank contamination.

Field IDs:

AT-Q-21-WS-8 AT-P-4-SB-4-D

AT-Q-35-WS-8

AT-Q-21-WS-8-D SA-S-1-WS-9

AT-Q-32-SB-6

SA-S-2-SB-4

AT-Q-33-SB-5

AT-P-4-SB-4

### 1.0 Chain of Custody/Sample Condition

 Do Chain-of-Custody forms list all samp	all samples analyzed?	¥		
Are all Chain-of-Custody forms signed, in	signed, indicating sample chain-of-custody was maintained?	X		
 Do the Traffic Reports, chain-of-custody analytical problems or special circumstar	-custody, and lab narrative indicate any problems with sample receipt, condition of samples, roumstances affecting the quality of the data?		X	

The laboratory case narrative indicated that the method blank had detections above the MDL. Note:

The narrative also indicated that the LCS had recoveries outside QC limits.

### 2.0 Holding Time/ Preservation (Code H)

					ICS	ONI	INA
2.1	Do sample preservati	Do sample preservation, collection and storage condition meet method requirement?	ge condition meet met	hod requirement?	X		
÷	If sample preservation	in and/or temperature wa	as inappropriate (i.e.,	f sample preservation and/or temperature was inappropriate (i.e., <2°>6°C, etc.), comment in report. If unpreserved or			
	temperature is outside	e the range 0° (but not f	rozen) to 10° flag all	emperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If		-	
	temperature exceeds	emperature exceeds 10°, flag positive detections "J" and non-detects "R".	ions "J" and non-deter	sts "R".			į
2.2	Have any technical he	olding times, determine	d from sampling to da	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical he	olding times been gross	ly (twice the holding 1	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		×	

Note:

## 3.0 GC/MS Instrument Performance Check (Code T)

		7	2	
3.1 Are GC/N	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			X
3.2 Have all s	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			х
3.3 Have ion	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			х

Note:

## 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		3	-	4
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		x	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
	butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
	"J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			
			_	

Note: The method blank had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RE	Code
AT-Q-21-WS-8	Methylene Chloride	Ω	•	Z
AT-Q-21-WS-8	Methyl Isobutyl ketone	Ω	•	Z
AT-Q-21-WS-8-D	Methylene Chloride	Ω	-	Z
AT-Q-21-WS-8-D	Methyl Isobutyl ketone	Ω	-	Z
SA-S-2-SB-4	Methylene Chloride	Ω		Z
SA-S-1-WS-9	Methylene Chloride	Ω		Z
AT-Q-32-SB-6	Methylene Chloride	U	•	Z
AT-Q-32-SB-6	Methyl Isobutyl ketone	Ω	•	Z
AT-P-4-SB-4	Methylene Chloride	U		Z
AT-P-4-SB-4-D	Methylene Chloride	U	,	Z

### 5.0 GC/MS Initial Calibration (Code C)

		S	•	4
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

### 6.0 Continuing Calibration (Code C)

		2	2	4717
6.1	Are Continuing Calibration Summary forms present and complete?			х
6.2	Has a continuing calibration standard been analyzed every 12 hours?			х
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			X
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $< 20\%$ )?			x
	If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For $\%D > 50\%$ , flag R.	. =		
6.5	Do any compounds have an RRF $< 0.05$ (use 0.01 for poor responders)? If yes, $J(+)/R(-)$ .			X
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	No No	A
7.1	Are all sample	es listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Form?	X		
7.2	Are surrogate	recoveries within acceptan	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	P for all samples?	X	_	
7.3	If No in Section	If No in Section 7.2, were these sample(s) of	s) or method blank(s) reanalyzed?	d?			Х
7.4	If No in Section	on 7.3, is any sample diluti	on factor greater than 10? (Sur	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
	Note: If SMC	recoveries do not meet ac	ceptance criteria in samples ch	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	equired.					
		> UCT	10% to LCL	<10%			
	Positive	J	J	J			
-	Non-detect	None	UJ	R			

		Yes	No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)		÷	

Note:

# 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		r es	INO	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		х	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

The LCS had recoveries above the QC limits; however, all associated samples were reported non-detect. No qualifications were required. Note:

### 10.0 Internal Standards (Code I)

					1 53	0.1	INA
10.1	Are internal standa	Are internal standard areas for every sample and blank within upper and lower QC limits?	lank within upper and low	ver QC limits?	Х		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	UJ	R			
	The method specifi	ication is for the continuing cali	bration to be compared to	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibrat	ion. Thus, if all other QC speci:	fications are met for a giv	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,			
	the reviewer may c	he reviewer may choose not to flag individual samples in this case.	ples in this case.				
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	seconds of the associated	calibration standard?	X		
	Action: The chrom	natogram must be examined to c	letermine if any false posi	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the revi	iewer may consider partial or to	tal rejection of the data fo	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	v.		

### 11.0 TCL Identification (Code W)

		153	ONI	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			<b>&gt;</b>
	calibration?			4
-	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
711.7	do sample and standard relative ion intensities agree within 30%?			×

Note:

# 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

12.1	Are RLs used consistent with those specified in the QAPP?		×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?		×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

### 13.0 Field Duplicate Samples (Code F)

		~~~	212	4 4 4
13.1	Were any field duplicates submitted for VOC analysis?	X		
		The state of the s		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X	,	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB-4.

14.0 Data Completeness

14.1 sample)	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	r aqueous sample, 90% for soil	X	
14.2 Num	Number of samples:	6		
14.3 Num	Number of target compounds in each analysis:	33		
14.4 Num	Number of results rejected and not reported:	0		
%C	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$			
2 %	% Completeness	100		

DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:Bart BrandenburgDate:10/6/2005LaboratorySevern Trent Laboratory - Savannah

Sauget - Area 2 21561510.60011 SAS 027 Level III

Project Name: Project Number:

SDG No.: Review Level:

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs: AT-Q-21-WS-8 SA-S-1-WS-9

AT-Q-21-WS-8-D AT-Q-33-SB-5

AT-P-4-SB-4

AT-Q-32-SB-6

SA-S-2-SB-4 AT-Q-35-WS-8 AT-P-4-SB-4-D

1.0 Chain of Custody/Sample Condition

			 4.4.
1.1	Do Chain-of-Custody forms list all samples analyzed?	x	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X	
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×	

Note: The LCS/LCSD had recoveries outside QC limits.

2.0 Holding Time/ Preservation (Code H)

	200	3		5
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (>			
	10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
7:7	Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

3.0 GC/MS Instrument Performance Check (Code T)

		ıes	res No NA	NA
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			х
3.2	Have all samples been analyzed within twelve hours of the tune?			X
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note

4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

4.1 Is a Method Blank Summary form present for each batch? 4.2 Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)? 4.3 Do any field equipment blanks have positive results (TCL, and/or TIC)? Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations. If Level IV, review raw data and verify all detections for blanks were reported.			SOI	WII ON	INT
4.2 Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)? 4.3 Do any field equipment blanks have positive results (TCL, and/or TIC)? Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations. 4.4 If Level IV, review raw data and verify all detections for blanks were reported.	4.1	Is a Method Blank Summary form present for each batch?	X		
4.3 Do any field equipment blanks have positive results (TCL, and/or TIC)? Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations. 4.4 If Level IV, review raw data and verify all detections for blanks were reported.	4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the detection limit elevated to the RL for estimate concentrations. 4.4 If Level IV, review raw data and verify all detections for blanks were reported.	4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		X	
detection limit elevated to the KL for estimate concentrations. 4.4 If Level IV, review raw data and verify all detections for blanks were reported.		Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the			
4.4 If Level IV, review raw data and verify all detections for blanks were reported.		detection limit elevated to the RL for estimate concentrations.			
	4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

5.0 GC/MS Initial Calibration (Code C)

		S	4
5.1	Are Initial Calibration summary forms present and complete for each instrument used?		×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?	85,4	×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, $J(+)/R(-)$.		×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.		×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.		

6.0 Continuing Calibration (Code C)

		r es	2	N
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			X
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			х
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			x
	If yes, a marginal increase in response $>20\%$ then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$. For $\%D > 50\%$, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, $J(+)/R(-)$.			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

7.0 Surrogate Recovery (Code S)

					Yes	₽ 8	NA
7.1	Are all sampl	Are all samples listed on the appropriate S	opriate Surrogate Recovery Summary Form?	orm?	×		
7.2	Are surrogate	recoveries within acceptance	e criteria specified in the QAPP	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	×		
7.3	Are more than	Are more than one of either fraction outside the acceptance criteria?	le the acceptance criteria?			X	
7.4	If Yes in Sect	If Yes in Section 7.3, are these sample(s) o	nple(s) or method blank(s) reanalyzed?				×
7.5	If Yes in Sect	If Yes in Section 7.3, is any sample dilutio	e dilution factor greater than 10?				×
	Note: If SMC acids and base	Note: If SMC recoveries display unacceptable racids and base/ neutrals are assessed senarately.	table recoveries in the MS and/ately.	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids and base/ neutrals are assessed separately.			
			TCT	<10%			
	Positive	·	-	ima			
	Non-detect	None	UJ	R			

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		S		T T
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may require			
	rejection. RPD failures may be flagged "J" (+ only)			

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		~~~	2.	
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	x		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		х	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td>÷</td><td></td></lcl,>		÷	
9.4	If Level IV, verify the % recoveries are calculated correctly.			

The LCS/LCSD had 53 out of 64 analyte recoveries below QC limits. Qualifications are listed below. Note:

Field ID	Analyte	Qualification	- Code
AT-Q-33-SB-5	Ali SVOCs	ſŊ/ſ	7
AT-Q-35-WS-8	Ali SVOCs	fn/f	Т
AT-P-4-SB-4	Ali SVOCs	tu/t	7
AT-P-4-SB-4-D	All SVOCs	ſŊ/ſ	1
At-P-4-SB-4-DDL	All SVOCs	ſŊ/ſ	1

### 10.0 Internal Standards (Code I)

					231	ONT	Ž.
10.1	Are internal standar	rd area of every sample and blan	c within upper and lower (	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	ſ	J	ſ			
	Non-detect	None	UJ	R			
	The method specific	cation is for the continuing calib	ration to be compared to the	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibration	on. Thus, if all other QC specifi	cations are met for a given	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the	-02		
	reviewer may choos	reviewer may choose not to flag individual samples in this case.	in this case.				
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	econds of the associated c	alibration standard?	X		
	Action: The chrom	atogram must be examined to de	termine if any false positiv	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the revie	ewer may consider partial or tota	I rejection of the data for 1	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

### 11.0 TCL Identification (Code W)

	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing		,
	calibration?		×
11.0	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do		
11.2	sample and standard relative ion intensities agree within 30%?		×

Note:

## 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		X es	xes   No   NA	NA
12.1	Are RLs used consistent with those specified in the QAPP?			×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

13.0 Field Duplic	13.0 Field Duplicate Samples (Code F)	Xes.	No	NA
13.1	Were any field duplicates submitted for SVOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits?	×		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB-4. Note:

#### 14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	us sample, 90% for soil sample)	X		
14.2	Number of samples:	6			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100			

#### DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Project Number: Project Name: Bart Brandenburg 10/5/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah Laboratory

21561511.60011 Sauget - Area 2 Level III SAS 027

Review Level:

SDG No.:

Major Anomalies:

Samples were rejected based on surrogate and LCS recoveries.

Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

AT-Q-21-WS-8-D AT-Q-21-WS-8 SA-A-1-WS-9 Field IDs:

AT-Q-32-SB-6

AT-Q-33-SB-5 AT-P-4-SB-4

AT-Q-35-WS-8

SA-S-2-SB-4

AT-P-4-SB-4-D

## 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×		
Note:	The laboratory case narrative indicated that the LCS and surrogates had recoveries outside QC limits			

The laboratory case narrative indicated that the LCS and surrogates had recoveries outside QC limits

The narrative also indicated that the method blank had detections above the MDL.

## 2.0 Holding Time/ Preservation (Code H)

		153	140	INA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
r	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached			
7:7	Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		A	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		221		V.
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results (TCL)?	х		
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to			
	the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

The method blank sample had detections above the MDL; however all associated data were reported non-detect or at greater than 5X the blank concentrations. No qualification of data was required.

## 4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			X
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

### 5.0 Initial Calibration (Code R)

		3	217	UNI
5.1	Are Initial Calibration summary forms present and complete for each instrument used?	0)(6)		x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

### 6.0 Continuing Calibration (Code C)

		X es	No No	A N
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits $(\%D < 15\%)$ ?			×
	If yes, a marginal increase in response $>20\%$ then J(+) only, a decrease in response then J(+)/ UJ(-). For $\%D > 50\%$ , flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

### 7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sampl	es listed on the appropria	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	nary Form?	X		
7.2	Are surrogate	recoveries within accept	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	QAPP for all samples?		×	
7.3	If No in Secti	on 7.2, were these sampl	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	lyzed?	×		
7.4	If No in Secti	on 7.3, is any sample dilu	ution factor greater than 10?	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			x
		> UCL	10% to LCL	< 10%			
	Positive	J	ſ	ſ			
	Non-detect None	None	UJ	8			

Several samples had surrogate recoveries outside QC limits. Qualifications are listed below.

Surrogate Limits	30-150	30-150
Surrogate Recoveries	8	25
Surrogate	DCB Decachlorobiphenyl	DCB Decachlorobiphenyl
Field ID	SA-S-2-SB-4	AT-Q-33-SB-5

Analyte Qualification Code	All Pesticides J/R S	All Pesticides J/UJ S
Field ID	SA-S-2-SB-4	AT-Q-33-SB-5

8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

			!
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?		X
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		X
:	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> .  Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)		,

Note:

9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
9.4	If Level IV, verify the % recoveries are calculated correctly.			×
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

2		
Ī	96	9†
Li	38-136	34-146
S	38	34
Н		
ies		
Ver		
003	20	0
R	` '	
اڭ ا		l
H		$\dashv$
	_	
Ϋ́	Dieldrin	Endrin
na	iek	Ju5
<b>*</b>	D	
	28	85
	45(	45(
II S	0-1	680-14
ij	89	89
	LCS 680-14568	LCS 680-14568
	L	

Code	Т	T		Г	Т	Т	Г	Г	Г	
Code	7	T	7	T	Т	Т	Т	Т	Т	1
Qualification	UJ	R	UJ	R	Ωî	R	UJ	R	ſŊ	8
Analyte	Dieldrin	Endrin	Dieldrin	Endrin	Dieldrin	Endrin	Dieldrin	Endrin	Dieldrin	Endrin
Field ID	AT-Q-21-WS-8	AT-Q-21-WS-8	AT-Q-21-WS-8-D	AT-Q-21-WS-8-D	SA-S-2-SB-4	SA-S-2-SB-4	9-SW-1-S-PS	SA-S-1-WS-9	AT-Q-32-SB-6	AT-O-32-SB-6

### 10.0 TCL Identification (Code W)

NA	;	x
No		
Yes		
	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the	10.1 continuing calibration?

Note:

# 11.0 TCL Quantitation and Reported Detection limits (Code P)

		 7.0	4717
11.1	Are RLs used consistent with those specified in the QAPP?		x
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		x
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
11.4	If Level IV, calculate a sample of positive results to verify correct calculations		

Note

## 12.0 Field Duplicate Samples (Code F)

		22.	# 7 L T
12.1	Were any field duplicates submitted for analysis?	×	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		

Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as the duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB.

### 13.0 Data Completeness

Note:

	7.45.7		l res	00	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for	or use 95% for aqueous sample, 90% for			
1.61	soil sample)		¥		
13.2	Number of samples:	6			
13.3	Number of target compounds in each analysis:	21			
13.4	Number of results rejected and not reported:	24			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$	1			
	% Completeness	87.3			

### DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer: Bart Brandenburg

Date: 10/6/2005

10/6/2005 Severn Trent Laboratory - Savannah

Project Name: Project Number:

Review Level:

SDG No.:

Sauget - Area 2 21561510.60010 SAS 027 Level III

Major Anomalies:

Laboratory

No samples were rejected

Minor Anomalies:

Samples were qualified based on LCS recoveries.

AT-Q-21-WS-8

Field IDs:

SA-S-1-WS-9 AT-Q-32-SB-6

AT-Q-21-WS-8-D AT-Q-33-SB-5

AT-P-4-SB-4

SA-S-2-SB-4

AT-Q-35-WS-8 AT-P-4-SB-4-D

1.0 Chain of Custody/Sample Condition

1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X	:	
	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			
C.I	samples, analytical problems or special circumstances affecting the quality of the data?	×		

The laboratory case narrative indicated that the LCS had recoveries outside the QC limits.

## 2.0 Holding Time/ Preservation (Code H)

		1 53		ŧ.
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, $J(+)/UJ(-)$ .		¥	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		200	2	4 7
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		¥	
3.3	Do any field/rinse/equipment blanks have positive results?		¥	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

### 4.0 Initial Calibration (Code R)

		1 63	110	T.
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			Х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note

### 5.0 Continuing Calibration (Code C)

		201	ONT	¥.
5.1	Are Continuing Calibration Summary forms present and complete?			X
5.2	Has a continuing calibration standard been analyzed every 12 hours?			x
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $< 20\%$ )?			X
	If yes, a marginal increase in response >20% then $J(+)$ only, a decrease in response then $J(+)/UJ(-)$ . For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note

### 6.0 Surrogate Recovery (Code S)

					Yes	No	NA
6.1	Are all sample	es listed on the appropriat	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Form?	X		
6.2	Are surrogate	recoveries within accepta	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	PP for all samples?	X		
6.3	If No in Secti	If No in Section 6.2, were these sample(s)	(s) or method blank(s) reanalyzed?	iq.			×
6.4	If No in Secti	If No in Section 6.3, is any sample dilution	tion factor greater than 10? (Sur	factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> UCL	10% to LCL	<10%			
	Positive	J	ſ	ſ			
	Non-detect	None	UJ	R			

Note:

# 7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		ICS	NO	NO NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10%			

# 8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code Ee - RPD)

		22.1	7.0	UNI
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	×		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

	Qualification	Code
	ſ	L
	J	1
	ſ	Г
	J	Г
	J	Γ
A1-1-4-3B-4	ſ	L

### 9.0 TCL Identification (Code W)

		31	INO	INA
0	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
9.1	continuing calibration?			×

## 10.0 TCL Quantitation and Reported Detection limits (Code P)

		S	ANI ONI	INA
10.1	Are RLs used consistent with those specified in the QAPP?			X
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			x
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

### 11.0 Field Duplicate Samples (Code F)

		2	2	# 7 L T
11.1	Were any field duplicates submitted for herbicide analysis?	X		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
·	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB-4. Note:

#### 12.0 Data Completeness

			65.1	2	
12.1	1s % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	95% for aqueous sample, 90% for soil	4		
	sample)		4		
12.2	Number of samples:	6			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)				
	% Completeness	100			

## DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Bradenburg	Project Name:	Sauget - Area 2
Date:	10/6/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 027
		Review Level:	Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

AT-Q-21-WS-8-D AT-Q-33-SB-5 AT-Q-21-WS-8 SA-S-1-WS-9 Field IDs:

AT-Q-32-SB-6

AT-Q-33-SB-5 AT-Q-35-WS-8 AT-P-4-SB-4-D

SA-S-2-SB-4

CVAA-Hg

GFAA

ICP-MS

ICP

## 1.0 Chain of Custody/Sample Condition/Raw Data

		Yes	No N	VA Ye	Yes No NA Yes No NA Yes No NA Yes No	NA	Yes	<u>z</u> %	IA Ye	Ž	NA	
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	X										
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X							r			
	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample		2 30 2 A				, fer-					
1.3	receipt, condition of samples, analytical problems or special circumstances affecting the quality of	×					* 1000.0			×		
	the data?					S. W.	.0					
1 4	Does sample preservation, collection and storage meet method requirement? (water samples: with											
<u> </u>	Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$ )	×								*		_
	Are the digestion logs present and complete with pH values, sample weights, dilutions, final										<u>'</u>	Π
1.5	volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete	X	-							×		
	documentation, contact the laboratory for explanation/resubmittal.											

The laboratory case narrative indicated that the method blank had detections above the MDL. Note:

### 2.0 Holding Time (Code H)

		Yes	No	No NA Yes	No	No NA Yes No NA Yes No	No N	IA Y	S N	o NA	4
2.1	Have any technical holding times, determined from date of collection to date of analysis, been		1								
7.7	exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		4						₹		
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)										
	$\int J(+)/R(-)$ .									. ry	

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

### 3.0 Instrument Calibration (Code C)

							ICP		ICP-MS		GFAA	A	CVAA-Hg	۰-Hg
						Yes	N N	No NA Yes		No NA Yes	_	No NA Yes	es No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard;	ncluded in th	e calibration curv	e? (ICP/ICP-MS:	blank + one standard;			,	- 7 (See					
7.1	GFAA: blank + three standards; CVAA: blank + five standards)	dards; CVAA	: blank + five stan	dards)				<b>X</b>						
3.2	Are the correlation coefficients > 0.995? (for GFAA an	ients > 0.995	? (for GFAA and (	d CVAA) Action: J(+)/UJ(-).	+)/UJ(-).									×
c	Was an initial calibration verification (ICV) analyzed	verification (	(ICV) analyzed at	the beginning of e	at the beginning of each analysis? Action:				7 8 KG		524			
5.5	If no, use professional judgment to determine affect on	gment to dete	ermine affect on the	e data and note in 1	the data and note in reviewer narrative.			<u> </u>						×
	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours,	on verificatio	on (CCV) perform	ed every 10 analy	ysis or every 2 hours,									
3.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on the	nt? Action:	If no, use professi	onal judgment to	determine affect on the	-		×						×
	data and note in reviewer narrative.	narrative.										67.4		
3 %	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury	d percent rec	overies (ICV and o	CCV) within the co	ontrol limits? Mercury	,		,						1
	(80%-120%) and other Metals (90%-110%).	stals (90%-11	10%).					Y				. 5 6		×
	Action:	R(+/-)	J(+)/UJ(-)	J(+)	R(+)									
	Mercury	< 65%	65% - 79%	121% - 135%	> 135%									
	Other Metals	< 75%	75% - 89%	111% - 125% > 125%	> 125%									

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		I	ICP	ICI	ICP-MS	GFAA	4	CVAA-Hg	-Hg
:		Yes	No NA Yes		No NA Yes		No NA Yes	es No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per	X						×	
	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are								
4.2	determined for positive and negative blank values.	×						×	
7.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to	•						•	
£.+	determine affect on the data note in reviewer narrative.	¥							
	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours								
4.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on the	×						×	
	data to note in reviewer narrative.								
7.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank	÷	-	2019				,	Talak
C <b>.</b> ‡	value are determined for positive and negative blank values.	Y.						*	
16	Are there samples with concentrations less than five times the highest level in associated blanks?		,	. 3				•	
O.+	Action: If yes, U at reported concentration.		A					<b>A</b>	
7	Are there samples with non-detect results or with concentrations less than five times the most							- 1	
4:/	negative value in associated blanks? Action; If yes, J(+)/UJ(-).		Y					¥	

Several target analyte values were detected above the IDL; however, the sample values were greater than 5 times the blank results. No qualification of data was required. Note:

### 5.0 ICP Interference Check Sample (ICS) (Code N)

								ICP		ICP-MS		GFAA	_	CVAA-Hg	.Hg
							Yes	No	IA Yes	No	VA Yes	No	No NA Yes No NA Yes No NA Yes No NA	No	NA
5 1	Was ICS Al	3 analyzed a	t beginning of ea	tch ICP run (or	r at least twice ev	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the			,	335871					
٦٠٠	beginning or	once every	8 hours (whicheve	er is more frequ	beginning or once every 8 hours (whichever is more frequent) for ICP-MS?				Y	U.34					
5.2	Are the ICS	AB recoverie	Are the ICS AB recoveries within 80% - 120%?	20%5					х			,			
5.3	Are the resul	ts for unspik	Are the results for unspiked analytes (in ICS A) < + IDL	3S A) < + IDL?	,				×		į				
5.4	If not, are th	e associated	sample Al, Ca, Fe	e, and Mg conc	entrations less than	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?			×						
	Action:	Not Spike	Not Spiked Analytes	Spiked	Spiked analytes (ICS AB analytes)	analytes)									
		<-IDI	> IDL	< 50%	20% - 79%	> 120%									
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)									

		<u></u>	I	ICP	)I	ICP-MS		GFAA	A	CV.	CVAA-Hg	g
		Y	es D	NO NA	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	No I	VA Ye	s No	NA	Yes	No	NA .
6.1	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per	ı, per	,	-		•				þ	-	
0.1	matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.		Ą							¥	-	
6.2	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)	g and		X							X	
	Action: Solid Aqueous	_						4,0				
	< LCL $>$ UCL $<$ 50% $50%$ - 79% $>$ 120%											
	J(+)/UJ(-) $J(+)$ $R(+/-)$ $J(+)/UJ(-)$ $J(+)$		. No.	7 A 48								

Note:

#### 7.0 Laboratory Duplicates (Code K)

CVAA-Hg

GFAA

ICP-MS

ICP

		Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	NA	Yes	No	IA Yes	No	NA )	(es	No 1	ΝΑ
7.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with Duplicate results.	×						UNGLIG FARTS	¥	-, ,	
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.	X								X	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids) Action: If no, J(+).	×							×	•	
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.										

All RPDs were within criteria, sample AT-Q-35-WS-8 was used as the duplicate sample. Note:

8/7/2006

	•		•											
						ICP		ICP-MS	MS		GFAA		CVAA-Hg	A-Hg
					Yes	No	NA Yes		No NA Yes	Yes	No	No NA Yes		No NA
	Was a spik	red sample prepared	d and analyzed at the corr	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per	per									
8.1	batch, per 1	matrix and per leve	el)? Action: If no, J(+), w	batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	not	×							•	×
	associated v	associated with matrix spike results.	sults.											
69	Was a field	1 blank used for the	Was a field blank used for the MS analysis? Action: 1	If yes, J(+) with professional judgment.	ent.									
7:0	Note in worksheet.	rksheet.												
	Note: Mat	rix spike analysis	may be performed on a fi	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous	sno								***	
	sample in an SDG.	n SDG.							200					
	For all ana	lytes with sample o	concentration < 4 x spike co	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within	hin	40000000						28		
8.3	the control	limit of 75-125%?	(No control limit applies to	the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike	ike		×							
	concentration.)	on.)												
		%R > 125%	30% < %R < 74%	%R < 30%								1.4		
	Positive	J	J	J										
	Non-detect	None	UJ	R										

Note:

#### 9.0 Instrument Detection Limits (IDL)

Note:

#### 10.0 ICP Serial Dilutions (Code S)

			ICP		ICP-MS	S	GFAA		CV/	CVAA-Hg	်စ်
		Yes	No N	IA Yes	No	NA Ye	Yes No NA Yes No NA Yes No NA Yes No NA	NA \	es	9Z	NA
10.1	10.1 Were serial dilutions performed?	X			(F.S.)						
10.2	10.2 Was a five-fold dilution performed?	×			15.38						
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the x	×			8/2/2/2						

Samples AT-Q-35-WS-8, SA-S-2-SB-4, AT-Q-SB-5, and AT-Q-32-SB-6 were diluted and analyzed, all recoveries were within QC limits.

#### 11.0 Field Duplicate Samples (Code F)

		Yes 1	<u>۷</u>	No NA Yes No NA Yes	No	NA Ye	o NA	No NA Yes	γ̈́	NA
11.1	Were any field duplicates submitted for metal analysis?	×			2330.00			×		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$ )	×			**************************************			×		

ICP-MS

Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were submitted as the duplicate samples for AT-Q-21-WS-8 and AT-P-4-SB-4. Note:

#### 12.0 Result Verification (Code Q)

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

#### 13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous					
13.1	sample, 90% for soil sample)	:				
13.2	13.2 Number of samples:	6	Ľ	_	0	6
13.3	Number of target compounds in each analysis:	22		_	0	-
13.4	Number of results rejected and not reported:	0		_	0	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$					
	% Completeness	100	####	##	####	100

#### DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Project Number: Project Name: Review Level: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 10/6/2005 Ammonia Laboratory Test Name: Reviewer: Date:

21561510.60011 Sauget - Area 2 SAS 027 Level III

#### Major Anomalies:

350.1

Method No.:

No samples were rejected

#### Minor Anomalies:

No samples were qualified in this SDG.

AT-P-4-SB-4-D SA-S-2-SB-4 AT-Q-21-WS-8-D AT-Q-33-SB-5 AT-P-4-SB-4 AT-Q-21-WS-8 SA-S-1-WS-9 AT-Q-32-SB-6 Field IDs:

AT-Q-35-WS-8

#### 1.0 Chain of Custody/Sample Condition

1.1 Do Chain-of-Custody forms list all samples analyzed?  1.2 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?  1.3 Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?				
1.2 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?  Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	1.1		X	
Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,  1.3 analytical problems or special circumstances affecting the quality of the data?	1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×	
	1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples analytical problems or special circumstances affecting the quality of the data?	X	

Note:

#### 2.0 Holding Time/ Preservation (Code H)

2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(•).		×	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

#### 4.0 Initial Calibration (Code C)

		110	47.7
4.1	Are Initial Calibration summary forms present and complete for each instrument used?		x
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?		x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".	,	
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.		

Note:

#### 5.0 Continuing Calibration (Code R)

		Yes	S S	NA
5.1	Are Continuing Calibration Summary forms present and complete?			Х
5.2	Has a continuing calibration standard been analyzed every 10 samples?			Х
5.3	Do any analytes have a %R outside QC limits (80-120%)?			Х
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

# 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

6.1 Is a Matrix Spike/Matrix Spike Duplicate recovery form present?
Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?
within acceptance criteria specified in the QAPP?
Ising informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC riteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may equire rejection. RPD failures may be flagged "J" (+ only)

Note:

## 7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X	,	
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only, <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

#### 8.0 Analyte Identification

		Yes	No	NA
0 1	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in			,
0.1	the continuing calibration?			*

Note:

### 9.0 Analyte Quantitation and Reported Detection limits

9.1	Are RLs used consistent with those specified in the QAPP?	_	×
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".	ŕ	×
9.4	If Level IV, calculate a sample of positive results to verify correct calculations		

#### 10.0 Field Duplicate Samples (Code F)

		1 53	ONT	INCK
10.1	Were any field duplicates submitted?	X		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	Х		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Samples AT-Q-21-WS-8-D and AT-P-4-SB-4-D were analyzed in duplicate for samples AT-Q-21-WS-8 and AT-P-4-SB-4.

#### 11.0 Laboratory Duplicates (Code K)

11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	x	
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		×
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < \( \preceq \) PQL for aqueous, and RPD < 35% or difference < \( \preceq \) X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.		×

Note:

#### 12.0 Data Completeness

		Yes	No NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	r soil 🔭 🗴	
12.2	Number of samples:		
12.3	Number of target compounds in each analysis:		
12.4	Number of results rejected and not reported:		
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$		
	% Completeness 100		

MA

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				,
			~	

#### DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer: Bart Brandenburg

Date: 10/12/2005

Date: 10/12/2005

Laboratory Severn Trent Laboratory - Savannah

Project Name: Ss Project Number: 2

SDG No.: Review Level:

Sauget - Area 2 21561510.60011 SAS 028 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on method blank contamination.

Field IDs: SOIL-O-5-SB-5.5

AT-P-2-WS-10 SOIL-O-8

SOIL-0-9 IDW-SITES

IDW-AT-Q-32

SOIL-0-10

1.0 Chain of Custody/Sample Condition

		Yes	2	₹ Z
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
13	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples.			
1.3	analytical problems or special circumstances affecting the quality of the data?	×		

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.

2.0 Holding Time/ Preservation (Code H)

					ıcs	2	ď
2.1	Do sample preservatio	n, collection and storag	Oo sample preservation, collection and storage condition meet method requirement?	od requirement?	×		
	If sample preservation	and/or temperature wa	s inappropriate (i.e., <2	If sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or			
	temperature is outside t	the range 0° (but not fi	rozen) to 10° flag all p	the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds 10	0°, flag positive detect	1°, flag positive detections "J" and non-detects "R".	, "R".			
2.2	Have any technical ho	Iding times, determine	d from sampling to date	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical ho	Iding times been grossl	ly (twice the holding tin	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		×	

### 3.0 GC/MS Instrument Performance Check (Code T)

		Yes	S.	Y Z
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			×
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			×
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			×

Note:

### 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	ŝ	Y V
4.1	Is a Method Blank Summary form present for each batch?	¥		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?	x		
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		×	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
	butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
	"J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			×

Note: The method blank had detections above the MDL. Qualifications are listed below.

<del>(2000-</del>		<del>,</del>	
Code	Z	Z	Z
New RL	-	1	
Qualification	Ŋ	Ω	n
Analyte	Methylene chloride	Methylene chloride	Methylene chloride
Field ID	SOIL-0-5-SB-5.5	AT-P-2-WS-10	SOIT-0-9

#### 5.0 GC/MS Initial Calibration (Code C)

		CS I	WI ON ST	V.	_
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×	
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×	
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".				
53	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders	200			
ر.ر	like ketones or alcohols)? If yes, J(+)/R(-).	ed.		×	_
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×	
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.				
MI-4					_

#### 6.0 Continuing Calibration (Code C)

		Yes	ŝ	Ą	
-	Are Continuing Calibration Summary forms present and complete?			×	
.2	Has a continuing calibration standard been analyzed every 12 hours?			×	T
.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×	_
4.	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits $(\%D < 20\%)$ ?			×	
	If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For %D $> 50\%$ , flag R.		٠		<del></del>
5.	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			×	т
9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.				_

Note:

#### 7.0 Surrogate Recovery (Code S)

					Yes	No	Y Y
7.1	Are all samples listed	es listed on the appropriate	on the appropriate Surrogate Recovery Summary Form?	Form?	Y		
7.2	Are surrogate recover		ies within acceptance criteria specified in the QAPP for all samples?	P for all samples?	×		
7.3	If No in Section 7.2, v	on 7.2, were these sample(	vere these sample(s) or method blank(s) reanalyzed?	ίP			×
7.4	If No in Section 7.3, i		tion factor greater than 10? (Sur	any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
	Note: If SMC recover	recoveries do not meet a	cceptance criteria in samples cho	ies do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	equired.					
		> UCL	10% to LCL	<10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	n	R			

Note:

## 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		TO ING	0.1	V
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			<b>×</b>
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries < 10% may			
	require rejection. RPD failures may be flagged "J" (+ only)		•	

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		res	res No NA	Z A
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	¥		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td>,</td></lcl,>			,

Note:

#### 10.0 Internal Standards (Code I)

					Yes	s Z	₹ Z
10.1	Are internal stand	Are internal standard areas for every sample and blank within upper and lower QC limits?	blank within upper and low	ver QC limits?	×		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	n	R			
	The method specif	fication is for the continuing ca	libration to be compared to	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibration.	tion. Thus, if all other QC spec	ifications are met for a giv	Thus, if all other QC specifications are met for a given sample, using informed professional			
	judgment, the revi	udgment, the reviewer may choose not to flag individual samples in this case.	dividual samples in this cas	ž.			
10.2	Are retention time	Are retention times of internal standards within 30 seconds of the associated calibration standard?	0 seconds of the associated	calibration standard?	×		
	Action: The chror	natogram must be examined to	determine if any false posi	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the rev	iewer may consider partial or t	otal rejection of the data fo	nagnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

#### 11.0 TCL Identification (Code W)

		Yes	ON No	¥ Z
1111	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			
1.11	calibration?			×
11.5	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
7.11	do sample and standard relative ion intensities agree within 30%?			×

## 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		res	I CS	Y.
12.1	Are RLs used consistent with those specified in the QAPP?			×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

#### 13.0 Field Duplicate Samples (Code F)

		Xes	No No	₹ Z
13.1	Were any field duplicates submitted for VOC analysis?		×	
13.2	Were all RPD or absolute difference values within the control limits outlined in the OAPP?			,
				< -
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

#### 14.0 Data Completeness

		Yes	Š	NA A
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	x x		
14.2	Number of samples:			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)			
	% Completeness 100			

#### SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION WORKSHEET

21561510.60011 Sauget - Area 2 SAS 028 Project Number: Project Name: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 10/12/2005 Laboratory Reviewer: Date:

Level III

Review Level:

AT-P-2-WS-10

IDW-AT-Q-32

Samples were qualified based on MS/MSD and LCS recoveries.

No samples were rejected

Major Anomalies:

Minor Anomalies:

SOIL-0-5-SB-5.5

Field IDs:

SOIL-0-10

SOIL-0-8

SOIL-0-9

IDW-SITES

#### 1.0 Chain of Custody/Sample Condition

		Yes	N ₀	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x		

The laboratory case narrative indicated that the MS/MSD and the LCS had recoveries outside QC limits. Note:

2.0 Holding Time/ Preservation (Code H)

				i
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (>			
	10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
, ,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
7:7	Table for sample holding time) If yes, J(+)/UJ(-).	200	×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-),		•	

### 3.0 GC/MS Instrument Performance Check (Code T)

		ıcs	<u> </u>	¥.
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			×
3.2	Have all samples been analyzed within twelve hours of the tune?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

# 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		7	1777	4 74 7
4.1	Is a Method Blank Summary form present for each batch?	×		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		И	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the			
	detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

#### 5.0 GC/MS Initial Calibration (Code C)

		Yes	No NA	A V
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

#### 6.0 Continuing Calibration (Code C)

		3	ON	Į.
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $<$ 20%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

#### 7.0 Surrogate Recovery (Code S)

					Yes	Š	Y.
7.1	Are all samp	les listed on the appropriat	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	mary Form?	X		
7.2	Are surrogate	recoveries within accepta	ance criteria specified in the	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	×		
7.3	Are more than	1 one of either fraction out	Are more than one of either fraction outside the acceptance criteria?	i		X	
7.4	If Yes in Sect	ion 7.3, are these sample(s	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	Jyzed?			×
7.5	If Yes in Sect	If Yes in Section 7.3, is any sample dilu	le dilution factor greater than 10?				×
	Note: If SMC	recoveries display unacc	eptable recoveries in the M:	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and			
	acids and base	acids and base/ neutrals are assessed separately.	parately.				
		> OCL	10% to LCL	<10%			
	Positive	J	ſ	ſ			
	Non-detect	None	UJ	R			

Note:

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		- S	Tes Out - Sal	¥.
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			
Note:	The MS/MSD sample AT-P-2-WS-10 had 64 out of 65 analyte recoveries below the OC limits. Onalifications are listed below			

The MS/MSD sample AT-P-2-WS-10 had 64 out of 65 analyte recoveries below the QC limits. Qualifications are listed below.

Qualification Code.	J/UJ M	Code L, RPD - Code E)	Yes No NA		y for each matrix?	ptance criteria? x	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" th="" uj(-);=""><th>alculated correctly.</th><th>The T CO contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to t</th></lcl,>	alculated correctly.	The T CO contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to the contained to t
	All SVOCs	9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)		Is an LCS recovery form present?	Is LCS analyzed at the required frequency for each matrix?	Are all LCS %Rs (and RPDs) within acceptance criteria?	Action for specific compound outside the acceptance criteria: 9 failures should be flagged "J" (+ only)	If Level IV, verify the % recoveries are calculated correctly.	The I Of Last 100 600 17071 Last 60 17071
Field ID	AT-P-2-WS-10	9.0 Laboratory Co		9.1	9.2	9.3		9.4	Mote:

The LCS sample LCS 680-13324 had 60 out of 65 analyte recoveries below QC limits. Qualifications are listed below.

Field ID	Analyte	Qualification	Code
SOIL-0-5-SB-5.5	All SVOCs	J/UJ	T
SOIL-O-5-SB-5.5DL	All SVOCs	J/UJ	T
AT-P-2-WS-10	All SVOCs*	J/UJ	Ţ
AT-P-2-WS-10DL	Ali SVOCs	J/UJ	T

#### 10.0 Internal Standards (Code I)

						_	
10.1 Are i	internal standard	area of every sample and blank	within upper and lower QC	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	x		
		Area > +100%	Area < -50% Ar	Area < -10%			
Positive	tive	ſ	J	ſ			
Non-	Non-detect	None	U	R			
The	method specifica	ttion is for the continuing calibre	tion to be compared to the n	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note: contin	inuing calibration	n. Thus, if all other QC specific.	itions are met for a given sar	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,			
the re	eviewer may cho	he reviewer may choose not to flag individual samples in this case.	es in this case.				
10.2 Are re	retention times of	Are retention times of internal standards within 30 seconds of the associated calibration standard?	conds of the associated calib	ration standard?	X		
Actio	on: The chromat	togram must be examined to dete	rmine if any false positives	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
magn	magnitude, the reviewer may consi	wer may consider partial or total	rejection of the data for non-	der partial or total rejection of the data for non-detects in that sample/fraction.			

#### 11.0 TCL Identification (Code W)

		Yes	°Z	Z A	
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			×	
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			×	

Note:

## 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		res	res   No   NA	¥.
12.1	Are RLs used consistent with those specified in the QAPP?			×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			*
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

#### 13.0 Field Duplicate Samples (Code F)

		S	0	NA V
13.1	Were any field duplicates submitted for SVOC analysis?		×	
13.2	Were all RPD or absolute difference values within the control limits?			>
				<
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

#### 14.0 Data Completeness

			r es	0 Z	A Z
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	% for soil sample)	¥		
14.2	Number of samples:				
14.3	Number of target compounds in each analysis:				
14.4	Number of results rejected and not reported:		-		
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness 100		-		

#### DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Project Name: Severn Trent Laboratory - Savannah Bart Brandenburg 10/12/2005 Laboratory Reviewer: Date:

 Project Name:
 Sauget - A

 Project Number:
 21561511.

 SDG No.:
 SAS 028.

 Review Level:
 Level III.

Sauget - Area 2 21561511.60011

Major Anomalies:

No samples were rejected.

Minor Anomalies:

No qualifications were required in this SDG.

Field IDs: SOIL-O-5-SB-5.5 SOIL-O-10

SOIL-O-9 IDW-SITES

AT-P-2-WS-10 SOIL-O-8

AIDW-AT-Q-32

#### 1.0 Chain of Custody/Sample Condition

		3	2	Į.
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note:

#### 2.0 Holding Time/ Preservation (Code H)

		ຣ໌ ເ	TES IN INT	W
2.1	Do sample preservation, collection and storage condition meet method requirement?	×		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> $10^{9}$ C), then flag all positive results with a "J" and all non-detects "UJ".		-	
	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding	מַּב		
7:7	Time Table for sample holding time) If yes, $J(+)/UJ(\cdot)$ .	.093 (100	4	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		×	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

77.		Yes	Š.	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results (TCL)?		×	!
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		×	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to			
	the RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

### 4.0 GC/ECD Instrument Performance Check (Code B)

		res	I ES NO IVA	Y.
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			×
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

#### 5.0 Initial Calibration (Code R)

		x es	00	¥Z
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

#### 6.0 Continuing Calibration (Code C)

<u> </u>	×	×	×		
Yes No NA					
2	Voor-e	e" yor			
Yes					
7.00	Are Continuing Calibration Summary forms present and complete?	Has a continuing calibration standard been analyzed every 12 hours?	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < 15%)?	If yes, a marginal increase in response >20% then $J(+)$ only, a decrease in response then $J(+)/UJ(-)$ . For %D > 50%, flag R.	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.
	6.1	6.2	6.3		6.4

Note:

#### 7.0 Surrogate Recovery (Code S)

					Yes	S Z	N A
7.1	Are all samples listed on t	s listed on the appropriate	the appropriate Surrogate Recovery Summary Form?	y Form?	X		
7.2	Are surrogate recoveries v	recoveries within acceptan	within acceptance criteria specified in the QAPP for all samples?	APP for all samples?	X		
7.3	If No in Sectio	in 7.2, were these sample(s	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	zed?			×
7.4	If No in Sectio	n 7.3, is any sample dilutic	on factor greater than 10? (Su	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> NCT	10% to LCL	< 10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	UJ	R			

Note:

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	S.	Y Z
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.3	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for		İ	
7:0	each matrix?	×		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	*		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other	***************************************		
	OC criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries			

Sample AT-P-2-WS-10 was analyzed as the MS/MSD for PCBs.

## 9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		r es	res No NA	Y.
9.1	Is an LCS recovery form present?	X		
9.5	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	x		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flazeed="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

#### 10.0 TCL Identification (Code W)

		Yes	S Z	Y Z	
101	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the				
10.1	continuing calibration?			×	

Note:

### 11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	ŝ	A A
11.1	Are RLs used consistent with those specified in the QAPP?			×
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			!
			-	

Note:

#### 12.0 Field Duplicate Samples (Code F)

		S	2	W
12.1	Were any field duplicates submitted for analysis?		×	
		0.0000000000000000000000000000000000000		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			<b> </b>
				•
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

#### 13.0 Data Completeness

		Yes	No	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	s sample, 90% for soil		
	sample)	•		
13.2	Number of samples:	7		
13.3	Number of target compounds in each analysis:	21		
13.4	Number of results rejected and not reported:	0		
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			
	% Completeness	001		

#### DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Reviewer:Bart BrandenburgDate:10/12/2005LaboratorySevern Trent Laboratory - Savannah

Project Name: Project Number: SDG No.: Review Level:

Sauget - Area 2
21561510.60010
SAS 028
Level III

Major Anomalies:

No samples were rejected

#### Minor Anomalies:

Samples were qualified based on surrogate and LCS recoveries.

Field IDs: Soil-O-5-SB-5.5

AT-P-2-WS-10 SOIL-0-8

SOIL-0-9 IDW-SITES

#### 1.0 Chain of Custody/Sample Condition

SOIL-0-10 IDW-AT-Q-32

		2	1
1.1	Do Chain-of-Custody forms list all samples analyzed?	X	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X	
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of		
C.1	samples, analytical problems or special circumstances affecting the quality of the data?	×	

The laboratory case narrative indicated that the LCS and surrogates had recoveries outside the QC limits. Note:

#### 2.0 Holding Time/ Preservation (Code H)

		Yes	No	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(•).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)R(-).		×	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		3	2	17.7
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		Х	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

#### 4.0 Initial Calibration (Code R)

		SOI	ONT	W
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

#### 5.0 Continuing Calibration (Code C)

		x es	NO NA	NA
5.1	Are Continuing Calibration Summary forms present and complete?			х
5.2	Has a continuing calibration standard been analyzed every 12 hours?			Х
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $< 20\%$ )?			×
	If yes, a marginal increase in response >20% then J(+) only, a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			-

#### 6.0 Surrogate Recovery (Code S)

					Yes	å	NA A
6.1	Are all sampl	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Surrogate Recovery Summ	ary Form?	×		
6.2	Are surrogate	Are surrogate recoveries within acceptan	in acceptance criteria specified in the QAPP for all samples?	QAPP for all samples?		<b>*</b>	
6.3	If No in Secti	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?	s) or method blank(s) reanal	yzed?		*   *	
6.4	If No in Secti	on 6.3 is any sample dilution	on factor greater than 109	f No in Section 6.3, is any sample dilution factor greater than 109 (Surroges secondarios may be differed and			
		warm aiding time a tau	on tactor ground tridit 10:	Surrogate recoveries intay be unuted out.)		×	
		> NCT	10% to LCL	<10%			
	Positive	J	ſ	ſ			:
	Non-detect	None	UJ	R			

Note: Surrogate recoveries were outside QC limits. Qualifications are listed below.

Surrogate Limits	35-134	35-134
Surrogate Recoveries	13	01
Surrogate	DCAA	DCAA
Field ID	SOIL-O-10	IDW-SITES

I <del>r</del>		
Code	S	v
Qualification	J/UJ	J/UJ
Analyte	All Herbicides	All Herbicides
Field ID	SOIL-0-10	IDW-SITES

# 7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	Š.	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
	A MCM (ST)			
7.2	Are MS/MSDS analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each			
1	matrix?			×
C	20 CO 200 CO 11 T			
ر./ ان	Are all MS/MSD % and RPDs within acceptance criteria Specified in the QAPP?			>
	Total information of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the secon			<
_	Some missing professional Judginent, the data reviewer should use the MS and MSD results in conjunction with other OC			
	criteria and determine the need for qualification of the data for samples from the grammarian processing the parameters and determine the need for many and determine the parameters.			
	The same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same street of the same stre	_		
	require rejection. RPD failures may be flagged "J" (+ only)			
		-	-	

## 8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		×	:
8.4	If Level IV, verify the % recoveries are calculated correctly.			•
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS had recoveries outside QC limits. Qualifications are listed below.

46-144	293/92	s 080-12942 Fentachlorophenol
LCS Limits	LCS Recovery	LCS ID Analyte

- Code	Т .
Qualification	J
Analyte	Pentachlorophenol
Field ID	SOIL-0-9

#### 9.0 TCL Identification (Code W)

	THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE P	ICS	INO	INA	_
-	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the				_
7.1	continuing calibration?			×	_

Note:

### 10.0 TCL Quantitation and Reported Detection limits (Code P)

		res	ANI ONI	NA.
10.1	Are RLs used consistent with those specified in the QAPP?			×
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

#### 11.0 Field Duplicate Samples (Code F)

		X es	Ŝ	Y.
11.1	Were any field duplicates submitted for herbicide analysis?		×	
		Company of Company of Company		
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			X
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note

#### 12.0 Data Completeness

		Yes	å	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	<u>x</u>		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness			

#### DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

21561510.60011 Sauget - Area 2 SAS 028 Level III Project Number: Project Name: Review Level: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 10/12/2005 Laboratory Reviewer: Date:

Major Anomalies:

No samples were rejected

Minor Anomalies:

Samples were qualified based on method blank contamination and MS/MSD recoveries.

SOIL-0-5-SB-5.5 SOIL-0-10 Field IDs:

IDW-AT-Q-32

1.0 Chain of Custody/Sample Condition/Raw Data

CVAA-Hg

GFAA

ICP-MS

ICP

IDW-SITES SOIL-0-9

AT-P-2-WS-10 SOIL-0-8

		Yes	No	Yes No NA Yes No NA Yes No NA Yes No	%	NA Y	ss N	NA	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	×			300 800			lacksquare	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х							X		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	X								X	
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4 + 2 + 2 + 2 = 0$	ж		5 55.70 2 5.70					X		
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete x documentation, contact the laboratory for explanation/resubmittal.	×						-	X		
Note:	The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.				ļ.						

The narrative also indicated that the method blank had detections above the MDL.

#### 2.0 Holding Time (Code H)

		ICP		ICP-MS	S	g	GFAA		CVAA-Hg	-Hg
	Yes	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	A Yes	No	NA	Yes	No.	NA Yes	ž	NA
Have any technical holding times, determined from date of collection to date of analysis, been										
exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		×						:	×	
Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)										

Note:

#### 3.0 Instrument Calibration (Code C)

						ICP		ICP-MS	1S	g	GFAA	C	CVAA-Hg	Hg
					Yes	No	No NA Yes		No NA Yes	Yes	No NA Yes	Yes	No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/GFA: blank + three standards; CVAA: blank + five standards)	the calibration curve? (ICP/ICP-MS: blank + one standard; / AA: blank + five standards)	? (ICP/ICP-MS: blandards)	ank + one standard;			×							
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).	.995? (for GFAA and	CVAA) Action: J(	+)/UJ(-).					T. 5 4 2					×
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	ation (ICV) analyzed Igment to determine a	at the beginning iffect on the data ar	of each analysis? Id note in reviewer			×							×
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	ation (CCV) performe on: If no, use profess tive.	ed every 10 analysi: iional judgment to c	s or every 2 hours, letermine affect on			×							×
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	ant recoveries (ICV at a stals (90%-110%).	and CCV) within	the control limits?			×		contractions.					×
	Action: R(+/-)	·) I(+)/UI(-)	J(+)	R(+)										
	Mercury <65%	% 65% - 79%	121% - 135% > 135%	> 135%										
	Other Metals <75%	%68 - %52 9	111% - 125% > 125%	> 125%					(0.0).					

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP		ICP-MS	TS I	ij	GFAA	Ĺ	CVAA-Hg	ı-Hg	
i		Yes	No NA Yes	4 Yes		No NA Yes		Z 9	No NA Yes	No	NA	A
11	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per	J. C.			8777							Π
Ť	batch, per matrix and per level)?	×			افي العا				×			
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value	0										
7:1	are determined for positive and negative blank values.	×								×		
7	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to					148						
Ç:+	determine affect on the data note in reviewer narrative.	×				000			×	\$/3		
	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours	S			10,000			$\vdash$			_	Τ
4.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on	×			VO 248				×			
	the data to note in reviewer narrative.											
7	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the	[ ]		_								Π
2	blank value are determined for positive and negative blank values.	×								×		
46	Are there samples with concentrations less than five times the highest level in associated	ਚ		_					_			Γ
o: <del>†</del>	blanks? Action: If yes, U at reported concentration.		X							×		_
4.7	Are there samples with non-detect results or with concentrations less than five times the most			_					-			l
/:-	negative value in associated blanks? Action; If yes, J(+)/UJ(-).		X							×		
Note:	Several target analyte values were detected above the IDL. Qualifications are listed below.											1

		Γ	Γ	Γ		<u> </u>						,					
Code	d	d.	Ь	Ь	Ь	ď	Ь	Ь	Ь	Ь	Ь	Ь	Ь	Ь	Ь	Ь	Ь
New RL	•		-		•			,	,			•		,			•
Qualification	U	U	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	n	n	Ω	U
Analyte	Chromium	Chromium	Copper	Selenium	Aluminum	Chromium	Selenium	Aluminum	Selenium	Aluminum	Copper	Selenium	Copper	Selenium	Aluminum	Chromium	Selenium
Field ID	Soil-O-5-SB-5.5	AT-P-2-WS-10	AT-P-2-WS-10	AT-P-2-WS-10	SOIT-0-9	SOIT-0-9	SOIL-0-9	SOIL-0-10	SOIL-0-10	SOIL-0-8	SOIT-O-8	SOIL-0-8	IDW-SITES	IDW-SITES	IDW-AT-Q-32	IDW-AT-Q-32	IDW-AT-Q-32

### 5.0 ICP Interference Check Sample (ICS) (Code N)

								ICP	H	ICP-MS	S	GF	GFAA	C	CVAA-Hg	Hg
							Yes	N N	No NA Yes No NA Yes	No	NA Y	es N	√N ol	No NA Yes	No	NA
1 5	Was ICS A	B analyzed at	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the	CP run (or at	least twice every	8 hours), and at the										
1	beginning c	beginning or once every 8 hours (w	8 hours (whichever	is more freque	whichever is more frequent) for ICP-MS?				×	-						
5.2	Are the ICS	Are the ICS AB recoveries within	s within 80% - 120%?	2%					×	3,24.76						
5.3	Are the resu	ilts for unspik	Are the results for unspiked analytes (in ICS A) < + IDL?	A) < + IDL?					×							
5.4	If not, are t ICS?	If not, are the associated sample / ICS?	sample Al, Ca, Fe,	, and Mg cond	centrations less th	41, Ca, Fe, and Mg concentrations less than the level in the			×		-					
	Action:	Not Spike	Not Spiked Analytes	Spiked	Spiked analytes (ICS AB analytes)	analytes)							_	<u> </u>		
		<-IDF	>IDL	< 50%	20% - 79%	> 120%				3.33						
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)										
								١		$\ $		┨	╢			

## 6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

			ICP	_	ICP-MS		GFAA		CVAA-Hg	Hg
		Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	No	AA Yes	No	VA Ye	No	NA
. 19	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per	)er	jiyipric o							
	matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	4	20368							
( )	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and	pu								
7:0	Sb; Solid limits: as per EPA-EMSL/LV)		×						*	
	Action: Solid Aqueous									
	<lcl> UCL &lt;50% 50%-79% &gt; 120%</lcl>									
	J(+)/UJ(-) $J(+)$ $R(+/-)$ $J(+)/UJ(-)$ $J(+)$									

#### 7.0 Laboratory Duplicates (Code K)

			ICP	I	ICP-MS	_	GFAA	C	CVAA-Hg	Чg
		Yes	No NA	Yes	No N	4 Yes	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	A Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20									
7.1	samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, x	×			-			×		
	analytes not associated with Duplicate results.									
7.7	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional									
7:/	judgment. Note in worksheet.	,,,,,,,CSSS	<b>×</b>						×	
7.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for						38888			
j.	aqueous, and RPD < 35% or difference < \( \delta \) X PQL for solids) Action: If no, J(+).	×						×		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.									
Note:	All RPDs were within criteria, sample AT-P-2-WS-10 was used as the duplicate sample.									

8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

							ICP		ICP-MS		GFAA	_	CVAA-Hg	Hg
						Yes	No N	No NA Yes	No	No NA Yes		No NA Yes	No	NA
	Was a spiked	sample prepare	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per	ct frequency (	one per 20 samples, per	ī							66.	
8.1	batch, per mat	trix and per lev	batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	th professiona	l judgment, analytes no	т ж			8 (V s		VISS	×		
	associated wit	associated with matrix spike results.	results.						\$7,500					
6.0	Was a field bl	ank used for th	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment.	f yes, J(+) with	rofessional judgment	ئد	,				2		,	
7:0	Note in worksheet.	heet.				/(3)	42						×	
	Note: Matrix	spike analysis	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous	eld blank wher	n it is the only aqueous	s						L		
	sample in an SDG.	SDG.									144			
	For all analyt	es with sample	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries	e concentratic	on, are spike recoveries	s							## E	
8.3	within the con	within the control limit of 75-125%?	-125%? (No control limit a	pplies to analy	(No control limit applies to analytes with concentration >	^	×		279200				×	
	4 x spike concentration.)	centration.)												
	%F	%R > 125%	30% < %R < 74%	%R < 30%	%									
	Positive	J	ſ		ſ						Service Control	200	G SOL	
	Non-detect	None	UJ		R						3.377			

Sample AT-P-2-WS-10 was spiked and analyzed, recoveries were outside QC limits. Qualifications are listed below. Note:

MS/MSD Limits	75-125	75-125	75-125
MS/MSD recoveries	128 / 48	138 / 97	72 / 70
Analyte	Cadmium	Lead	Nickel
Field ID	AT-P-2-WS-10	AT-P-2-WS-10	AT-P-2-WS-10

TELLIT			• •
AT DISIJ	OF THE STORY ANALYTE	Quantication	Code
AT-P-2-WS-10	Cadmium	J	M
AT-P-2-WS-10	Lead	ſ	M
AT-P-2-WS-10	Nickel	ſ	M

#### 9.0 Instrument Detection Limits (IDL)

		ICP	<b>T</b>	CP-MS	2	GFA/	Ą	CVA	A-Hg
	Yes	No N.	A Yes	No	NA Yes	S NC	NA	(es N	N 0
g limits specified?		*	×				84.5117		×

9.1 Note:

#### 10.0 ICP Serial Dilutions (Code S)

	ICP-MS	GFAA	CVAA-Hg	A-Hg
Yes No NA	es No N	Yes No NA Yes No NA Yes No NA Yes No NA	A Yes N	NA of
×				
hin 10% for analyte concentration > 50 x the IDL in the				

Samples AT-P-2-WS-10, SOIL-0-9, and IDW-AT-Q-32 were diluted and analyzed, all %Ds were within QC limits. Note:

#### 11.0 Field Duplicate Samples (Code F)

								-			
		Yes	No NA	Yes	NA Yes No NA Ye	Yes No	No	VA Ye	ž	NA C	_
11.1	Were any field duplicates submitted for metal analysis?		×				r		×		Τ_
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$ )		×							×	1
				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							1

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

#### 12.0 Result Verification (Code Q)

			ICP	)I	ICP-MS		GFAA		CA'	CVAA-Hg	<u>9</u>
		Yes	No NA	Yes	No	Yes No NA Yes No NA Yes	No NA	-	Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?		×					2 QS 1/1C#			×
12.2	Were all dilution reflected in the positive results and detection limits?		x								×

#### 13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for					
1.5.1	aqueous sample, 90% for soil sample)	_				
13.2	Number of samples:	7	0			7
13.3	Number of target compounds in each analysis:	22	0			1
13.4	Number of results rejected and not reported:	0	0			0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$					
	% Completeness	100	####	##	####	100

#### DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Severn Trent Laboratory - Savannah Bart Brandenburg 10/12/2005 Ammonia Laboratory Test Name: Reviewer: Date:

Project Number: Project Name: SDG No.:

Review Level;

21561510.60011 Sauget - Area 2 Level III **SAS 028** 

Major Anomalies:

350.1

Method No.:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

Soil-O-5-SB-5.5 Field IDs:

AT-P-2-WS-10 SOIL-0-8

IDW-SITES SOIL-0-9

1.0 Chain of Custody/Sample Condition

IDW-AT-Q-32

SOIL-0-10

1.1 Do Chain-of-Custody forms list all samples analyzed?  1.2 Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?  1.3 Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?			Yes	No	NA
	1.1	4	×		
	1.2	1 M	4		
	1.3	eports,	•		
**** D	6.1			X	

Note:

### 2.0 Holding Time/ Preservation (Code H)

		I CS	NO NO	Y.
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "1" and all non-detects "11"			
, ,	Have any technical holding times, determined from sampling to date of analysis, heen exceeded? (See attached Holding			
7.7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
2.3	Have any technical holding times grossly (twice the holding time) heen avoseded? If you It \ND()	28 14		
	3 (+)/N(+).	à -	*	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	S _o	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		×	
3.3	Do any field/rinse/equipment blanks have positive results?		,	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RI for estimate (laboratory "I" flamed) concentrations			
	in the resultance (acondate) a magged convenience.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

### 4.0 Initial Calibration (Code C)

		Yes	ĝ	Y Z
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			<b> </b> ×
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			,
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R"			ا ،
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

### 5.0 Continuing Calibration (Code R)

		Yes	2°	Υ Z
5.1	Are Continuing Calibration Summary forms present and complete?			<b> </b>
5.2	Has a continuing calibration standard been analyzed every 10 samples?			•
5.3	Do any analytes have a %R outside QC limits (80-120%)?			٠,
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ [JJ(-) For %R < 50%			•
	flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

# 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Si	I CS NO NA	AA
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
63	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for			
7:0	each matrix?			×
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
		100 CONT. 100 CONT. 100 CONT. 100 CONT. 100 CONT. 100 CONT. 100 CONT. 100 CONT. 100 CONT. 100 CONT. 100 CONT.		
	Using miorned professional judgment, the data reviewer should use the MS and MSD results in conjunction with other			
	OC criteria and determine the need for qualification of the data for samples from the same site/matrix. Becoveries			
	The same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such that the same such	-		
	<10% may require rejection. RPD failures may be flagged "J" $(+  only)$			

Note:

# 7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	2	<b>4</b>
7.1	Is an LCS recovery form present?			
		×		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	¥		
73	Are all I CS WRs and RDDs within accountance metalic and in 41. O 4 ppo	1		i
	The second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of th	×		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
	(6)			

Note:

### 8.0 Analyte Identification

_	Т	Ţ
WAI	X	
ONI		
103		
	1s the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard	
,	8.1	Note

9.0 Analyte Quantitation and Reported Detection limits

		Yes	°Z	Ą Z
9.1	Are RLs used consistent with those specified in the QAPP?			*
0	]  -			4
7.6	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			,
				∢
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J"			;
	1			V.
9.4	II Level 1V, calculate a sample of positive results to verify correct calculations			

### 10.0 Field Duplicate Samples (Code F)

ny field duplicates submitted?		×	
ere all RPD or absolute difference values within the control limits outlined in the OADD?	6		
			×
for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.	oil). J(+) only.		

Note

### 11.0 Laboratory Duplicates (Code K)

Were Laboratory dupli and per level)? Action	line to the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second contract of the second con		֡
	were Laboratory suppresses prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	×	
Was a field blank used	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet	1 1 1	×
Are all analyte duplicate resul 35% or difference $< \pm 2 \text{ X P}$ Pduplicate results are $> 5 \text{ X IDI}$	cate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < $\pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and > 5 X IDL.		×

Note:

#### 12.0 Data Completeness

			Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	se 95% for aqueous sample, 90% for soil	X		
12.2	Number of samples:	7			
12.3	Number of target compounds in each analysis:				
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100			

	,			
			·	

#### DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Severn Trent Laboratory - Savannah Bart Brandenburg 10/12/2005 Laboratory Reviewer: Date:

Project Number: Project Name: SDG No.:

Review Level:

Sauget - Area 2 21561510.60011 Level III SAS 029

Major Anomalies:

No samples were rejected

Minor Anomalies:

No analytes required qualification, based on this data review.

AT-P-5-WS-12 Field IDs:

AT-P-3-WS-10

1.0 Chain of Custody/Sample Condition

		res	ON!	Y.
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

No anomalies were noted in the case narrative or cooler receipt forms.

2.0 Holding Time/ Preservation (Code H)

			1		Yes	9	Ą.
2.1	Do sample preservation, collectic	ion, collection and stor	on and storage condition meet method requirement?	hod requirement?	×		
	If sample preservation	on and/or temperature w	as inappropriate (i.e.,	If sample preservation and/or temperature was inappropriate (i.e., <2°>6°C, etc.), comment in report. If unpreserved or			
	temperature is outsid	le the range 0° (but not	frozen) to 10° flag all	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds	temperature exceeds 10°, flag positive detections "J" and non-detects "R".	tions "J" and non-dete	sts "R",			
2.2	Have any technical h	nolding times, determin	ed from sampling to da	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		×	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No .	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical h	nolding times been gros	sly (twice the holding t	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	
						00000000000000000000000000000000000000	

### 3.0 GC/MS Instrument Performance Check (Code T)

resent for bromofluorobenzene (BFB)?			×
of the BFB tune? If no, flag R.			×
), flag R.			×
within twelve hours BFB been met for ea	non rouns present for commonwoodscare (Er. 12):  In twelve hours of the BFB tune? If no, flag R.  been met for each instrument used? If no, flag R.	dag R. o, flag R.	dag R. o, flag R.

Note:

## 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		Yes	Yes No	NA
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		×	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
	butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
	"J" flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

### 5.0 GC/MS Initial Calibration (Code C)

		S	WAI ON	4
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).	375.		×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			
			-	

### 6.0 Continuing Calibration (Code C)

	and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second s	Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $< 20\%$ )?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

### 7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sample	s listed on the appropriate S	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	3 mio	X		
7.2	Are surrogate	recoveries within acceptanc	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	for all samples?	Χ		
7.3	If No in Sectic	in 7.2, were these sample(s)	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	ć			×
7.4	If No in Sectic	in 7.3, is any sample dilutio	n factor greater than 10? (Surre	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
	Note: If SMC	recoveries do not meet acc	eptance criteria in samples chos	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	equired.					
		> UCL	10% to LCL	<10%			
	Positive	J	J	ſ			
	Non-detect	None	UJ	R			

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		20 4		4 7 7
8.1	3.1 Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		Х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

Note:

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

9.1 Is an LCS recovery form present?  9.2 Is an LCS analyzed at the required frequency of one per twenty field samples for the all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?  9.4 If Level IV, verify the % recoveries are calculated correctly.  Action for specific compound outside the acceptance criteria: %R>UCL,		22	TAN ING	
9.2 Is an LCS analyzed at the required frequency of one per twen 9.3 Are all LCS %Rs and RPDs within acceptance criteria specifi 9.4 If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria:	present?	X		
9.3 Are all LCS %Rs and RPDs within acceptance criteria speciff 9.4 If Level IV, verify the % recoveries are calculated correctly. Action for specific compound outside the acceptance criteria:	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	×		
9.4 If Level IV, verify the % recoveries are calculated correctly.  Action for specific compound outside the acceptance criteria	Ds within acceptance criteria specified in the QAPP?	×		
Action for specific compound outside the acceptance criteria:	recoveries are calculated correctly.			
J(+) only; $<$ LCL, $J(+)/UJ(-)$ ; $<10%$ $J(+)/R(-)$ . RPD failures sl	ound outside the acceptance criteria: %R>UCL, J(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			

Note:

### 10.0 Internal Standards (Code I)

					Yes	N0	AN V
10.1	Are internal standa	Are internal standard areas for every sample and blank within upper and lower QC limits?	blank within upper and lov	ver QC limits?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	ſ	ſ			
	Non-detect	None	UJ	R			
	The method specifi	cation is for the continuing ca	libration to be compared to	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibrati	on. Thus, if all other QC spec	ifications are met for a give	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,			
	the reviewer may c	he reviewer may choose not to flag individual samples in this case.	mples in this case.				
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	0 seconds of the associated	d calibration standard?	×		
	Action: The chrom	natogram must be examined to	determine if any false pos	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the revi	ewer may consider partial or t	otal rejection of the data for	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

### 11.0 TCL Identification (Code W)

	100.00	1 53	0	Y.	
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			×	
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			×	

Note

## 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		,	
12.1	Are RLs used consistent with those specified in the QAPP?		×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?		×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations		
,			

Note:

### 13.0 Field Duplicate Samples (Code F)

		Yes	2	¥ Z
13.1	Were any field duplicates submitted for VOC analysis?		×	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

#### 14.0 Data Completeness

		Yes	No	Y V
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	X		
14.2	14.2 Number of samples:			
14.3	14.3 Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)			
	% Completeness			

Note

### DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Reviewer:Bart BrandenburgDate:10/12/2005LaboratorySevern Trent Laboratory - Savannah

Project Name: Project Number: SDG No.:

Review Level:

Sauget - Area 2 21561510.60011 SAS 029 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG

Field IDs:

AT-P-5-WS-12

AT-P-3-WS-10

1.0 Chain of Custody/Sample Condition

		☐ res	0.0	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
J. 1	analytical problems or special circumstances affecting the quality of the data?		X	

Note:

### 2.0 Holding Time/ Preservation (Code H)

		res	NO NA	<b>Y</b>
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		•
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10			
	^O C), then flag all positive results with a "J" and all non-detects "UJ".			
, ,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table			
<b>7:7</b>	for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		×	
		*	SCHOOL SALES AND AND AND AND AND AND AND AND AND AND	

### 3.0 GC/MS Instrument Performance Check (Code T)

		3	¥.
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?		×
3.2	Have all samples been analyzed within twelve hours of the tune?		 ×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".		
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?		×
	If no, all standards, blanks, field samples and QC samples are rejected "R".		

Note

# 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		)	1	!
4.1	4.1 Is a Method Blank Summary form present for each batch?	×		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		X	
·	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the			
	detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

### 5.0 GC/MS Initial Calibration (Code C)

		SI	ONI	W
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?	,		x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like			×
	differences and prictions): It yes, $J(\cdot)/IX(\cdot)$ .			
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			х
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

### 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

### 7.0 Surrogate Recovery (Code S)

					Yes	ž	NA NA
7.1	Are all samp	les listed on the appropr	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	y Form?	X		
7.2	Are surrogate	recoveries within accep	stance criteria specified in the QA	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?	×		
7.3	Are more tha	Are more than one of either fraction outsi	outside the acceptance criteria?			X	
7.4	If Yes in Seci	If Yes in Section 7.3, are these sample(s)	e(s) or method blank(s) reanalyzed?	d?			X
7.5	If Yes in Sect	tion 7.3, is any sample d	If Yes in Section 7.3, is any sample dilution factor greater than 10?				×
	Note: If SM(	C recoveries display una	cceptable recoveries in the MS ar	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids			
	and base/ neu	and base/ neutrals are assessed separately.	tely.				
		> NCT	10% to LCL	<10%		1	
	Positive	J		ſ	ļ	-	
	Non-detect	None	UJ	R			

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

			21.1	4 7 7
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?	X		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria			
	and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection.	-		
	RPD failures may be flagged "I" (+ only)			

Note

## 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	No	NA
9.1	9.1 Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	×		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	X		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

### 10.0 Internal Standards (Code I)

10.1						
10.1	e internal standard	area of every sample and blanl	k within upper and lower C	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	χ	
		Area > +100%	Area < -50%	Area < -10%		
Pos	Positive	<b>1</b>	ſ	ſ		
Nor	Non-detect	None	U	R		
The	e method specifical	tion is for the continuing calib	ration to be compared to th	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to continuing		
Note: cali	ibration. Thus, if a	all other QC specifications are	met for a given sample, usi	calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the reviewer may		
cho	ose not to flag ind	choose not to flag individual samples in this case.				
10.2 Are	e retention times of	Are retention times of internal standards within 30 seconds of the associated calibration standard?	econds of the associated ca	libration standard?	X	:   
Act	tion: The chromate	ogram must be examined to det	termine if any false positive	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude, the		
revi	iewer may conside	reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	e data for non-detects in th	at sample/fraction.	•	

11.1

	331	res	°Z	<b>∀</b> Z
Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the star- calibration?	and within 0.06 RRT units of the standard RRT in the continuing			x
Are the three ions of greatest intensity present in the standard mass spectrum also present in the sa and standard relative ion intensities agree within 30%?	ne standard mass spectrum also present in the sample mass spectrum; and do sample 30%?			×

Note:

11.2

## 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		) · ·	
12.1	Are RLs used consistent with those specified in the QAPP?		×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?		×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

### 13.0 Field Duplicate Samples (Code F)

		res	- 0 Z	A Z
13.1	Were any field duplicates submitted for SVOC analysis?		×	
,				
13.2	Were all RPD or absolute difference values within the control limits?			Þ
				4
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

#### 14.0 Data Completeness

14.1 Is % completeness w 14.2 Number of samples:	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)  Number of samples:	ous sample, 90% for soil sample)		
14.2 Number of sa	samples:		×	
		2		
14.3 Number of ta	14.3 Number of target compounds in each analysis:	65		
14.4 Number of re	Number of results rejected and not reported:	0		
% Completer	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$			
% Completeness	teness	100		

Note:

8/7/2006

### DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer: Bart Brandenburg

Date: 10/12/2005

Laboratory - Severn Trent Laboratory - Savannah

Project Name: Project Number: SDG No.:

Review Level:

Sauget - Area 2 21561511.60011 SAS 029 Level III

Major Anomalies:

Samples were rejected based on LCS recoveries.

#### Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs: AT-P-5-WS-12

AT-P-3-WS-10

### 1.0 Chain of Custody/Sample Condition

		S	0	Y.
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
-	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
C:1	analytical problems or special circumstances affecting the quality of the data?	×		

Note: The laboratory case narrative indicated that LCS recoveries were outside QC limits.

### 2.0 Holding Time/ Preservation (Code H)

		3	TATE OF THE STATE	5
2.1	Do sample preservation, collection and storage condition meet method requirement?	×		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	$(> 10^{\circ} C)$ , then flag all positive results with a "J" and all non-detects "UJ".			
,,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
7:-7	Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	No NA	Ą Z
3.1	Is a Method Blank Summary form present for each batch?	Х		
3.2	3.2 Do any method blanks have positive results (TCL)?		X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL		,	
	for estimate (laboratory "J" flagged) concentrations.			
3.4	3.4 If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

## 4.0 GC/ECD Instrument Performance Check (Code B)

		Yes	No	NA
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			×
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

### 5.0 Initial Calibration (Code R)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			×

#### 8/7/2006

### 6.0 Continuing Calibration (Code C)

		I CS	0	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < $15\%$ )?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	6.4 If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

### 7.0 Surrogate Recovery (Code S)

					Yes	Š.	NA
7.1	Are all sample	s listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	ary Form ?	X		
7.2	Are surrogate	recoveries within acceptar	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	APP for all samples?	X		
7.3	If No in Section	on 7.2, were these sample(	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	yzed?			×
7.4	If No in Section	If No in Section 7.3, is any sample diluti	on factor greater than 10? (	lilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> UCL	10% to LCL	<10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			-

Note:

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		res	res No NA	<b>V</b>
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		х	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

#### 8/7/2006

# 9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

<ul> <li>9.1 Is an LCS recovery form present?</li> <li>9.2 Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?</li> <li>9.3 Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?</li> <li>9.4 If Level IV, verify the % recoveries are calculated correctly.</li> <li>Action for specific compound outside the acceptance criteria: %R&gt;UCL, Action for specific compound outside the acceptance criteria: %R&gt;UCL, J(+)/UJ(-); &lt;10% J(+)/R(-). RPD failures should be flagged "J" (+ only)</li> </ul>			3	2	Ç
9.2 Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?  9.3 Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?  9.4 If Level IV, verify the % recoveries are calculated correctly.  Action for specific compound outside the acceptance criteria: %R>UCL,  Action for specific compound outside the acceptance criteria: %R>UCL,  J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td>9.1</td><td>Is an LCS recovery form present?</td><td>X</td><td></td><td></td></lcl,>	9.1	Is an LCS recovery form present?	X		
9.3 Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?  9.4 If Level IV, verify the % recoveries are calculated correctly.  Action for specific compound outside the acceptance criteria: %R>UCL,  [J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td>9.2</td><td>Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?</td><td>×</td><td></td><td></td></lcl,>	9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	×		
9.4 If Level IV, verify the % recoveries are calculated correctly.  Action for specific compound outside the acceptance criteria: %R>UCL,  J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td>9.3</td><td>Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?</td><td></td><td>×</td><td></td></lcl,>	9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
Action for specific compound outside the acceptance criteria: %R>UCL,  J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td>9.4</td><td>If Level IV, verify the % recoveries are calculated correctly.</td><td></td><td></td><td>×</td></lcl,>	9.4	If Level IV, verify the % recoveries are calculated correctly.			×
		Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

Analyte LCS Recovery LCS Limits	Dieldrin 20 38-136	Endrin 0 34-146
Analyte	Dieldrin	Endrin
FCS ID	LCS 680-14568	LCS 680-14568

Code	1	1	1	Г
Qualification	UJ	R	UJ	R
Analyte	Dieldrin	Endrin	Dieldrin	Endrin
Field ID	AT-P-5-WS-12	AT-P-5-WS-12	AT-P-3-WS-10	AT-P-3-WS-10

### 10.0 TCL Identification (Code W)

	х
7.40	
	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?
	10

Note:

## 11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	2 2	Ą Z
11.1	Are RLs used consistent with those specified in the QAPP?			×
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			*
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			!

### 12.0 Field Duplicate Samples (Code F)

		res	0 Z	Y Z
12.1	Were any field duplicates submitted for analysis?		×	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

#### 13.0 Data Completeness

		Yes	N _o	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	X		
13.2	Number of samples:			
13.3	Number of target compounds in each analysis:			
13.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			
	% Completeness 95.2			

#### DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Bart Brandenburg 10/12/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah

Laboratory

No samples were rejected

Major Anomalies:

Project Name:

**SAS 029** 

Review Level:

SDG No.:

Sauget - Area 2 21561510.60010

Project Number:

Level III

Field IDs:

AT-P-5-WS-12

No samples required qualification in this SDG.

Minor Anomalies:

AT-P-3-WS-10

### 1.0 Chain of Custody/Sample Condition

		Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х		
1 2	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
	analytical problems or special circumstances affecting the quality of the data?		×	

Note:

### 2.0 Holding Time/ Preservation (Code H)

		res	res No NA	A.
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10 OC), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Yes	2°	N A
3.1	Is a Method Blank Summary form present for each batch?	×		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		×	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note

### 4.0 Initial Calibration (Code R)

		Yes	Š	A A
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			х
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

### 5.0 Continuing Calibration (Code C)

		Xes	Yes No NA	₹ Z
5.1	5.1 Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 12 hours?			×
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $<$ 20%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

### 6.0 Surrogate Recovery (Code S)

					3	2	
6.1	Are all sample	s listed on the approprie	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Form?	×		
6.2	Are surrogate	recoveries within accep	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	PP for all samples?	×		:
6.3	If No in Section	on 6.2, were these sample	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?	¿pa			×
6.4	If No in Section	n 6.3, is any sample dil	ution factor greater than 10? (Su	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> NCT	10% to LCL	<10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

Note:

# 7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		1	)	
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			x
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection. RPD failures may be flagged "J" (+ only)			

Note:

# 8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		x es	res No NA	AN.
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	Ж		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td>-</td><td></td><td></td></lcl,>	-		

### 9.0 TCL Identification (Code W)

		Yes	ŝ	AZ.
0 1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
7.1	continuing calibration?			×

Note:

## 10.0 TCL Quantitation and Reported Detection limits (Code P)

		I CS	ON T	¥.
10.1	Are RLs used consistent with those specified in the QAPP?			×
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

### 11.0 Field Duplicate Samples (Code F)

		 2	4 7 . 7
11.1	Were any field duplicates submitted for herbicide analysis?	×	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		

Note:

#### 12.0 Data Completeness

		Yes	°Z	ΝA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil			
1.5.1	sample)	×		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	12.4 Number of results rejected and not reported:			
_	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness			

## DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Sauget - Area 2 Project Number: Project Name: Bart Brandenburg 10/12/2005 Reviewer: Date:

rroject Number:
SDG No.:
Review Level:

21561510.60011 SAS 029 Level III

Major Anomalies:

No samples were rejected

Severn Trent Laboratory - Savannah

Laboratory

Minor Anomalies:

Samples were qualified based on method blank contamination.

Field IDs:

AT-P-5-WS-12

AT-P-3-WS-10

CVAA-Hg

GFAA

ICP-MS

ICP

## 1.0 Chain of Custody/Sample Condition/Raw Data

		(es D	<u>고</u>	Yes No NA Yes No NA Yes No NA Yes No NA NA NA	No	NA	Yes ]	<u>z</u> %	A Yes	2 -	N N	
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	×							×			T
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×							×	ŭ a	<u> </u>	T
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality	×								×		
	of the data?				11.2							
1 4	Does sample preservation, collection and storage meet method requirement? (water samples:		_									П
	with Nitric Acid to pH $< 2$ , and soil/sediment samples: 4 0 C $+ 2$ 0 C)	<b>.</b>							<u></u>	9 0 1 3		
	Are the digestion logs present and complete with pH values, sample weights, dilutions, final		$\vdash$		186C :	3000						Т
1.5	volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete x	×							<b>×</b>			
	documentation, contact the laboratory for explanation/resubmittal.											

The laboratory case narrative indicated that the method blank had detections above the MDL. Note:

### 2.0 Holding Time (Code H)

			ICP		ICP-MS	S	GFAA	AA	$^{\circ}$	CVAA-Hg	Hg
		Yes	No	VA Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA	N S	o NA	Yes	No	NA
2.1	Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Her. 28days, other metale: 6 months) See attached Holding Time Toble		×							×	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)										
	]( ⊥   V   −	-				_					

Note:

### 3.0 Instrument Calibration (Code C)

AA-Hg	1		×	×	×	×			
CVAA-Hg	2	J. Pakuwa 2							
C	3								
3FAA C	INT								
$\cup$									1. 10 kg
CP-MS	25								
MS V	מאין ו								
$1 \simeq \Gamma$			9					3.38	
ICP ICP	1 03								
P VN	7110	X		*	×	×			
V	<u>ز</u> ا	q <del>'</del>		ä	S,	3.2			
		3.1 Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + three standards; CVAA: blank + five standards)	3.2 Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	3.5 Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	Action: $R(+/-)$ $J(+)/UJ(-)$ $J(+)$ $R(+)$	Mercury <65% 65%-79% 121%-135% >135%	Other Metals <75% 75% - 89% 111% - 125% > 125%

Note:

8/7/2006

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lanks
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4.0

CVAA-Hg

GFAA

ICP-MS

ICP

		Yes N	No NA Yes		No N	No NA Yes	 No NA Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	X		6			×		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	x						×	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	×					×		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	×					H		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	×						×	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		м					×	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, $J(+)/UJ(-)$ .		X					×	

Several target analyte values were detected above the IDL. Qualifications are listed below. Note:

Qualification New RL Code	- n	U 0.27 P	
Analyte	Aluminum	Aluminum	Chromium
Field ID	AT-P-5-WS-12	AT-P-3-WS-10	AT-P-3-WS-10

								ICP		ICP-MS		GFAA		CV	CVAA-Hg	50
							Yes	No NA Yes No NA Yes No NA Yes	Yes	No	A Yes	No	NA	es ]	No NA	NA
1.5	Was ICS A	B analyzed at	beginning of each	ICP run (or a	t least twice ever	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the									-	
7.1	beginning o	r once every {	beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	r is more frequ	ent) for ICP-MS?			× —								
5.2	Are the ICS	AB recoverie	Are the ICS AB recoveries within 80% - 120%?	2%0				×								
5.3	Are the resu	ilts for unspik	Are the results for unspiked analytes (in ICS A) < + IDL?	3 A) < + IDL?				×							-	
5.4	If not, are t ICS?	the associated	sample Al, Ca, I	e, and Mg co	ncentrations less	If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?		×		30% 300 11 4 4						
	Action:	Not Spike	Not Spiked Analytes	Spiked	analytes (ICS AB analytes)	analytes)				Stanton	-				1	
		<-IDF	> IDL	< 50%	50% - 79%	> 120%				hassa and "						
		UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)										

Note

# 6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

CVAA-Hg

GFAA

ICP

							Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA Yes No NA	No	NA N	Yes   N	<u>Z</u>	A Yes	å	NA
6.1	Was an LCS matrix and p	s prepared and ser level)? Act	Was an LCS prepared and analyzed at the correct free matrix and per level)? Action: If no, J(+) any sample	orrect freque y sample no	quency (one per 20 samples, per not associated with LCS results.	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	×							X		
6.2	Is any LCS Sb; Solid lin	Is any LCS recovery outside the control Sb; Solid limits: as per EPA-EMSL/LV)	ide the control lim A-EMSL/LV)	uts? (Aqueo	us limits: 80% -	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)	24.50(1).	×							×	:
	Action:	So	Solid		Aqueous											
		< TCT > NCT	> UCL	< 50%	20% - 79%	> 120%										
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)										

Note:

8/7/2006

			ICP	I	ICP-MS	S	GFAA		CVAA-Hg	g
		Yes	No	4 Yes	No	NA Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,								dover the state of	
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes	-	×		25301000				×	
	not associated with Duplicate results.								857 - 76	
7.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional		No.							
7: 7	judgment. Note in worksheet.		×							×
7.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for						, Q			
	aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids) Action: If no, J(+).		×							×
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.									

Note:

# 8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

CVAA-Hg

GFAA

ICP-MS

ICP

		Yes N	No NA Yes		No NA Yes	No NA Yes	A Yes	No	NA
8.1	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with matrix spike results.	X					×		
8.2	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.	X						×	
	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample in an SDG.								
, 8.3	For all analytes with sample concentration $< 4$ x spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration $> 4$ x spike concentration.)	×		5,745,6			×		
	%R > 125% 30% < %R < 74% %R < 30%								
	Positive J J								
	Non-detect None UJ R								

### 9.0 Instrument Detection Limits (IDL)

	Y. Control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the con	res	No N	Yes	No ]	NA Yes	No	NA Ye	No No	NA	
9.1	Are all IDL equal to or less than the reporting limits specified?		×							×	

CVAA-Hg

GFAA

ICP-MS

ICP

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

### 10.0 ICP Serial Dilutions (Code S)

		Yes	2 Z	NA Yes		$\frac{z}{2}$	A Yes		No NA Y	\  Yes	ž	Y V
10.1	Were serial dilutions performed?	X				$\vdash$		_	_			
10.2	Was a five-fold dilution performed?	X			200	$\vdash$	-	-			_	
103	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the					$\vdash$	$\vdash$	_	_		_	
C.O.I	original sample? If no, J(+).	X										

Note: Sample AT-P-5-WS-12 was diluted and analyzed.

### 11.0 Field Duplicate Samples (Code F)

	_		-		_	-
0	NA				×	
0	9N	×				
	Yes					/ WOW COMPANY
1	NA	188/20	Sa			8
	No					
	Yes		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			
	NA		~	9.868880		*
	%					
	Yes					
1	NA				×	*
	%	×				
	Yes		A)			
		11.1 Were any field duplicates submitted for metal analysis?		Are all field duplicate results within control? (For aqueous sample, RPD values < 50%	difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$ )	

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

### 12.0 Result Verification (Code Q)

	X	s	NO NA	Y es	V ON	4 Yes	z 8	A  Yes	ŝ	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?		×							×
		O CONTRACTOR OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF THE PERSON OF	$\frac{1}{1}$			15. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10. Sec. 10.		7.5		
12.2	otion limite?		;							
	The post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the post of the po	· ·	×						Ç1	×

CVAA-Hg

GFAA

ICP-MS

ICP

### 13.0 Data Completeness

	Is % completeness within the control limits? (Control limit: Check OAPP or use 95% for						
13.1	,						
13.2	Number of samples:	2	Ľ	<u> </u>	0	-	2
13.3	Number of target compounds in each analysis:	22		Ι_	0		-
13.4	Number of results rejected and not reported:	0	<u> </u>	Τ_	0		0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			1			
	% Completeness	100	####	#	#	•	100

#### DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Severn Trent Laboratory - Savannah Bart Brandenburg 10/12/2005 Ammonia 350.1 Method No.: Laboratory Test Name: Reviewer: Date:

21561510.60011 Sauget - Area 2

Project Number: Project Name:

Review Level:

SDG No.:

SAS 029 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples were qualified in this SDG.

AT-P-5-WS-12 Field IDs:

AT-P-3-WS-10

### 1.0 Chain of Custody/Sample Condition

		1	2	4
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of			
CI	samples, analytical problems or special circumstances affecting the quality of the data?		×	
, ,				

Note:

### 2.0 Holding Time/ Preservation (Code H)

		ទ	I es I NO I NA	<b>V</b>
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> $10^{9}$ C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
1	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		4	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		X es	YZ OZ	₹ Z
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

### 4.0 Initial Calibration (Code C)

		Xes	ŝ	A A
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			,
	A VALLY VA T = 31			*
	If not, $J(+)/UJ(-)$ . In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

### 5.0 Continuing Calibration (Code R)

		Yes	Š	NA
5.1	Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 10 samples?			*
5.3	Do any analytes have a %R outside QC limits (80-120%)?			٠   ×
	If yes, a marginal increase in response >20% then J(+) only, a decrease in response then J(+)/ UJ(-). For %R < 50%, flag			
	R.			
5.4	If Level IV, calculate a sample of %Rs.			

# 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		S 1		Y
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			*
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other			
	QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10%			
	may require rejection. RPD failures may be flagged "J" (+ only)	_		

Note:

# 7.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code R - RPD)

		Sar	AVI OVI	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td>•</td></lcl,>			•
		_	-	

Note:

### 8.0 Analyte Identification

		Yes	No	NA
8	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT			
5	in the continuing calibration?			×

Note:

## 9.0 Analyte Quantitation and Reported Detection limits

		res	ON	NA
9.1	Are RLs used consistent with those specified in the QAPP?			×
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			¥
				∢
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flae "J".			*
				<
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

### 10.0 Field Duplicate Samples (Code f)

		Y es	00	Y Y
10.1	Were any field duplicates submitted?		×	
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). 1(+) only.			

Note:

### 11.0 Laboratory Duplicates (Code K)

		Yes	S No	N A A
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.		×	l
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.			×
11.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < $\pm$ PQL for aqueous, and RPD < 35% or difference < $\pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.			×

Note:

### 12.0 Data Completeness

		Yes	Š	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	X		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)			
	% Completeness 100			

		•	

#### DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Project Number: Project Name: Review Level: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 9/15/2005 Laboratory Reviewer: Date:

Sauget - Area 2 21561510.60011 SAS 030 Level III

#### Major Anomalies:

No samples were rejected

#### Minor Anomalies:

No analytes required qualification, based on this data review.

	GM-19A GM-19A-D			
	TB-29 G			
Field IDs:			·	

## 1.0 Chain of Custody/Sample Condition

		23	2	W.
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х		
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
C.I	analytical problems or special circumstances affecting the quality of the data?	230.00	×	
Note:	No anomalies were noted in the case narrative or cooler receipt forms.			

No anomalies were noted in the case narrative or cooler receipt forms.

## 2.0 Holding Time/ Preservation (Code H)

					I ves	NO.	Y.
2.1	Do sample preservat	Oo sample preservation, collection and storage condition meet method requirement?	rage condition meet m	ethod requirement?	·X·		
	If sample preservatic	on and/or temperature	was inappropriate (i.e.,	f sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or			
	temperature is outsid	le the range 0° (but not	t frozen) to 10° flag al	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds	temperature exceeds 10°, flag positive detections "J" and non-detects "R".	ctions "J" and non-det	ects "R".			
2.2	Have any technical h	nolding times, determin	ned from sampling to c	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		x	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C_{\pm}^{2}C_{C}$	14 days	14 days			
2.3	Have any technical h	nolding times been gro-	ssly (twice the holding	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	
						CANADAM CONTRACTOR C	

Note:

## 3.0 GC/MS Instrument Performance Check (Code T)

		Yes	Š.	NA V
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			×
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			×
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			×
		90.00.00.00.00.00.00.00		

Note:

## 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

		r es	res No NA	<b>V</b>
4.1	Is a Method Blank Summary form present for each batch?	×		
4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	×		
	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
	butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory 1)	E		
	flagged) concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

Several of the trip blanks had methylene chloride detections above the MDL. All associated samples were non-detect for methylene chloride. No qualifications of data were required.

## 5.0 GC/MS Initial Calibration (Code C)

. !		Yes	Yes No	Y Y
Are	Are Initial Calibration summary forms present and complete for each instrument used?			×
Are	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
Ιfπ	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
E D	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders ike ketones or alcohols)? If yes, J(+)/R(-).			×
Is t	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
ΙŧΙ	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			
ı				

Note:

## 6.0 Continuing Calibration (Code C)

		Yes	No No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $< 20\%$ )?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

Note:

### 7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all samp	les listed on the approp	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	ımmary Form ?	X	-	
7.2	Are surrogate	Are surrogate recoveries within acce	ithin acceptance criteria specified in the QAPP for all samples?	the QAPP for all samples?	×		
7.3	If No in Secti	If No in Section 7.2, were these sam	hese sample(s) or method blank(s) reanalyzed?	analyzed?			×
7.4	If No in Secti	ion 7.3, is any sample of	dilution factor greater than 1	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
	Note: If SM	Note: If SMC recoveries do not mee	et acceptance criteria in sam	to not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required						
		> UCL	10% to LCL	<10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	ίΩ	R			

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		2	2	4
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			x
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrixRecoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

Note:

# 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E).

		S	I CO INT	W.
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	x		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

### 10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standaı	Are internal standard areas for every sample and blank within upper and lower QC limits?	lank within upper and lov	ver QC limits?	x		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	J	Ţ			
	Non-detect	None	U	R			
	The method specifi	cation is for the continuing call	bration to be compared to	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibrati	on. Thus, if all other QC specia	fications are met for a giv	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,	. t.		
	the reviewer may choose r	hoose not to flag individual samples in this case.	uples in this case.				
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	seconds of the associated	f calibration standard?	Х		
	Action: The chrom	atogram must be examined to d	letermine if any false pos	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			ļ
	magnitude, the revi-	ewer may consider partial or to	tal rejection of the data fo	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

### 11.0 TCL Identification (Code W)

		, se	0 Z	A A
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			×
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and sample and standard relative ion intensities agree within 30%?	0		×

Note:

## 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	ŝ	<b>V</b>
12.1	Are RLs used consistent with those specified in the QAPP?			×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

## 13.0 Field Duplicate Samples (Code F)

		2 Z	0	¥V.
13.1	Were any field duplicates submitted for VOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	Х		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples GM-19A and SA-0-3 were the parent samples for GM-19A-D and SA-0-3-D respectively.

#### 14.0 Data Completeness

			Yes	Š	AN A
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	e, 90% for soil	X		
14.2	Number of samples:				
14.3	Number of target compounds in each analysis: 33				
14.4	Number of results rejected and not reported:				
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness				

Note

#### 8/7/2006

#### SEMIVOLATILE ORGANIC ANALYSIS DATA VALIDATION WORKSHEET

21561510.60011 Sauget - Area 2 Project Number: Project Name: Severn Trent Laboratory - Savannah Bart Brandenburg 9/16/2005 Laboratory Reviewer: Date:

Review Level: SDG No.:

SAS 030 Level III

No samples were rejected

#### Minor Anomalies:

Field IDs:

Samples were qualified due to LCS, surrogate, and internal standard recoveries. Also due to method blank contamination and holding time criteria.

GM-19A	SA-0-3-D	SA-Q-7	SA-Q-6	
SA-0-02	SA-0-3	SA-Q-5	SA-Q-4	SA-Q-2
SA-0-1	GM-19A-D	GM-19C	SA-Q-8	SA-Q-3

## 1.0 Chain of Custody/Sample Condition

1.1	Do Chain-of-Custody forms list all samples analyzed?	X	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X	
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	x	

One sample had to be reanalyzed outside of holding time. Note:

The method blank had detections above the MDL.

The surrogates, LCS, and internal standards had recoveries outside QC limits

## 2.0 Holding Time/ Preservation (Code H)

		res	0	<b>V</b>
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10			
	^o C), then flag all positive results with a "J" and all non-detects "UJ".			
,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table			
7:7	for sample holding time) If yes, J(+)/UJ(-).	×		
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

One sample was re-extracted 6 days outside of holding time. Qualifications are listed below. Note:

Code	H
Days late	9
Qualification	J/UJ
Analyte	All SVOCs
Field ID	SA-Q-4RE

## 3.0 GC/MS Instrument Performance Check (Code T)

		r es	0	Y.
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			×
3.2	Have all samples been analyzed within twelve hours of the tune?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

# 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		ıes	ON	NA N
4.1	Is a Method Blank Summary form present for each batch?	×		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		*	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the			
	detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The method blank had detections above the MDL.

8/7/2006

Code	Z
Qualification	Ñ
Analyte	Diethyl phthalate
Field ID	SA-Q-4RE

## 5.0 GC/MS Initial Calibration (Code C)

		COL	ŧ.
5.1	Are Initial Calibration summary forms present and complete for each instrument used?		X
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?		x
:	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like		*
	annues and phenois)? If yes, $J(+)/R(-)$ .		ŧ
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.		×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.		
Note:			

## 6.0 Continuing Calibration (Code C)

		Yes	0 Z	Y V
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D < 20%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			*
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

## 7.0 Surrogate Recovery (Code S)

					res	ONI	NA
7.1	Are all sampl	Are all samples listed on the appropriate Surrogate I	te Surrogate Recovery Summary Form?	Form ?	X		
7.2	Are surrogate	recoveries within accepta	ince criteria specified in the QAP	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		×	
7.3	Are more than	one of either fraction ou	Are more than one of either fraction outside the acceptance criteria?		×		:
7.4	If Yes in Secti	If Yes in Section 7.3, are these sample(s) or method I	s) or method blank(s) reanalyzed?			x	
7.5	If Yes in Secti	on 7.3, is any sample dilu	If Yes in Section 7.3, is any sample dilution factor greater than 10?				×
	Note: If SMC	recoveries display unacc	eptable recoveries in the MS and	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids			
	and base/ neut	and base/ neutrals are assessed separately.	ıly.				
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect	None	UJ	R			

One sample and its reanalyses had surrogate recoveries below QC limits. Qualifications are listed below. Note:

tion	S	S
Qualifica	tu/t	tU/t
Analytes	All SVOCs	All SVOCs
Field ID	SA-Q-4	SA-Q-4RE

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

			2.1	4717
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?			×
		NO. STATE STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria			
	and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection.			

9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		res	No	NA
9.1	9.1 Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?		×	
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
9.4	If Level IV, verify the % recoveries are calculated correctly.			×

Note: The LCS had one analyte outside QC limits. Qualifications are listed below.

j	
LCS Limits	22-107
LCS Recovery	10
Analytes	4-Chloroaniline
TCS ID	680-16343

Code	Ţ	1	1	1	1	1	ı	1	1	Ţ	I	T	L	I
Qualification	ſſ	ſſ	f	ſ	ſ	ſ	ſ	ſſſ	m	m	ſ	ſ	ſ	ſſ
Analytes	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline	4-Chloroaniline
Field ID	SA-0-1	SA-0-2	GM-19A	GM-19A-D	SA-0-3	SA-0-3-D	GM-19C	SA-Q-5	SA-Q-7	SA-Q-8	SA-Q-4	SA-Q-6	SA-Q-3	SA-Q-2

## 10.0 Internal Standards (Code I)

					Yes	No	NA
10.1	Are internal standa	rd area of every sample and bla	ink within upper and lower	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?		x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	ſ	ſ			
	Non-detect	None	UJ	R			
Note:	ontinuing celibrati	ication is followed the Community Car	intration to be compared to	The incurso specification is for the continuing canoration to be compared to the line-point initial canoration, not sample to			
14016.	roviouse mov shoo	containing canoranon. Thus, it an outer (C. specifications are m parisones may abases not to fine individual complet in this area	incanons are met for a give	containing varioration. Thus, it ail outer VC specifications are met for a given sample, using informed professional judgment, the			
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	seconds of the associated	calibration standard?	X		
	Action: The chrom	natogram must be examined to	determine if any false posit	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude,			
	the reviewer may co	the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	of the data for non-detects	in that sample/fraction.			-

Note: Several samples had internal standards below QC limits. Qualifications are listed below.

Code		I	
Qualification	tu/t	J/UJ	J/UJ
Analyte	All SVOCs	All SVOCs	All SVOCs
Field ID	GM-19C	SA-Q-6	SA-Q-3

## 11.0 TCL Identification (Code W)

-	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing	120	
1111	calibration?		×
11.3	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do		
11.2	sample and standard relative ion intensities agree within 30%?		×

# 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		1 53	<b>*</b>
12.1	Are RLs used consistent with those specified in the QAPP?		×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?		х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

## 13.0 Field Duplicate Samples (Code F)

		Yes	%	NA
13.1	Were any field duplicates submitted for SVOC analysis?	X		
13.2	Were all RPD or absolute difference values within the control limits?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Samples GM-19A and SA-0-3 were submitted as the parent samples for GM-19A-D and SA-0-3-D.

#### 14.0 Data Completeness

		Yes	Š	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	x		
14.2	Number of samples:			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$			
	% Completeness			:

#### DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Bart Brandenburg Reviewer: Date:

Severn Trent Laboratory - Savannah 9/15/2005 Laboratory

Project Name:

Project Number: SDG No.:

21561511.60011 Sauget - Area 2 SAS 030

Review Level:

Level III

#### Major Anomalies:

No samples were rejected.

#### Minor Anomalies:

Samples were qualified based on surrogate recoveries.

SA-0-02	SA-0-3
SA-0-1	GM-19A-D
Field IDs:	

SA-0-3-D GM-19A

SA-Q-7 SA-Q-6

SA-Q-5

SA-Q-8 SA-Q-3

GM-19C

SA-Q-4 SA-Q-2

## 1.0 Chain of Custody/Sample Condition

		Yes	N _o	NA
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples.			
C.1	analytical problems or special circumstances affecting the quality of the data?	×		
Note:	The laboratory case narrative indicated that the surrogate and LCS recoveries were outside OC limits			

The laboratory case narrative indicated that the surrogate and LCS recoveries were outside QC limits

## 2.0 Holding Time/ Preservation (Code H)

		3	2	5
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
77	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	
		2		

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

_				
3.1	Is a Method Blank Summary form present for each batch?	Х		
3.2	Do any method blanks have positive results (TCL)?		X	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		×	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.		_	
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

## 4.0 GC/ECD Instrument Performance Check (Code B)

		2	)	771.7
4.1	Are Endrin and 4,4'-DDT breakdown forms present?	110		×
		Aprel 2, 5, 50, 50, 50, 50, 50, 50, 50, 50, 50,		
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			×
				,
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			X
		S. C. C. C. C. C. C. C. C. C. C. C. C. C.		
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

## 5.0 Initial Calibration (Code R)

		153	1 0 1   30	INA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			х
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

## 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			x
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < $15\%$ )?			x
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

## 7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sample	es listed on the appropri	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	ımary Form ?	X		
7.2	Are surrogate	recoveries within accep	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	e QAPP for all samples?	X		
7.3	If No in Section	on 7.2, were these samp	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	nalyzed?			×
7.4	If No in Section	on 7.3, is any sample di	lution factor greater than 10'	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> UCL	10% to LCL	<10%			
	Positive	J	J	ſ			
	Non-detect	None	UJ	R			

Several samples had surrogates recoveries outside QC limits. Qualifications are listed below. Note:

					_			
Surrogate Limits	30-150	30-150	30-150	30-150	30-150	30-150	30-150	30-150
Surrogate Recoveries	16	24	22	6	28	19	9	15
Surrogate	DCB Decachlorobiphenyl	DCB Decachlorobiphenyl	DCB Decachlorobiphenyl	DCB Decachlorobiphenyl	DCB Decachlorobiphenyl	DCB Decachlorobiphenyl	DCB Decachlorobiphenyl	DCB Decachlorobiphenyl
Field ID	SA-0-02	GM-19C	SA-Q-5	SA-Q-8	SA-Q-4	SA-Q-6	SA-Q-3	SA-Q-2

Code	S	S	S	S	S	S	S	S
Qualification	IU/I	IU/I	fD/f	J/R	în/î	ſΩ/ſ	J/R	f\O/f
Analytes	All Pesticides	All Pesticides	All Pesticides	All Pesticides	All Pesticides	All Pesticides	All Pesticides	All Pesticides
Field ID	SA-0-02	GM-19C	SA-Q-5	SA-Q-8	SA-Q-4	SA-Q-6	SA-Q-3	SA-Q-2

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		res	res No	NA
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		x	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

		3	2	
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

The LCS had recoveries above the QC limits creating a high bias. All associated data were reported non-detect; therefore, no qualifications were required. Note:

## 10.0 TCL Identification (Code W)

		Yes	No	NA
Is the re	lative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
continui	ng calibration?			×

Note:

## 11.0 TCL Quantitation and Reported Detection limits (Code P)

		Yes	No	NA
11.1	Are RLs used consistent with those specified in the QAPP?			×
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			:

Note:

## 12.0 Field Duplicate Samples (Code F)

		I es	0N	AA
12.1	Were any field duplicates submitted for analysis?	X		
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		:
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note: Samples GM-19A and SA-0-3 were the parent samples for GM-19A-D and SA-0-3-D.

#### 13.0 Data Completeness

I3 Is	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	for aqueous sample, 90% for soil		
	sample)		¥	
13.2 Nu	Number of samples:	14		
13.3 Nu	Number of target compounds in each analysis:	21		
13.4 Nu	Number of results rejected and not reported:	42		
%	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)			
%	% Completeness	85.7		

#### DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Bart Brandenburg 9/16/2005 Laboratory Reviewer: Date:

Severn Trent Laboratory - Savannah

21561510.60010 Sauget - Area 2 SAS 030 Level III

Project Number: Project Name:

Review Level:

SDG No.:

#### Major Anomalies:

No samples were rejected.

#### Minor Anomalies:

Field IDs:

No samples required qualification in this SDG.

	GIM-19A	SA-0-3-D	SA-Q-7	SA-Q-6	
C 0 40	2-0-YS	SA-0-3	SA-Q-5	SA-Q-4	SA-Q-2
SA-0-1	1-0-770	GM-19A-D	GM-19C	SA-Q-8	SA-Q-3

## 1.0 Chain of Custody/Sample Condition

		Yes	S	ΑN
			)	111
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
7.1	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×	•	
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples.	3300		
C:	analytical problems or special circumstances affecting the quality of the data?	_	X	
Note:	The laboratory case narrative indicated no problems.			

The laboratory case narrative indicated no problems.

## 2.0 Holding Time/ Preservation (Code H)

		x es	Yes No NA	₹Z
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
,,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If ves. J(+)/R(-).		٤	

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		3	2	4
3.1	Is a Method Blank Summary form present for each batch?	×		•
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

## 4.0 Initial Calibration (Code R)

Are Initial Calibration summary forms present and complete for each instrument used?
Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument
If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".
If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.

		Yes	Ŝ	<b>V</b>
5.1	5.1 Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 12 hours?			×
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $< 20\%$ )?			×
	If yes, a marginal increase in response $>20\%$ then J(+) only; a decrease in response then J(+)/ UJ(-). For $\%D > 50\%$ , flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

6.0 Surrogate Recovery (Code S)

					Yes	No.	NA
6.1	Are all sample	s listed on the appropria	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Form?	X		
6.2	Are surrogate	recoveries within accept	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	PP for all samples?	×		
6.3	If No in Section	If No in Section 6.2, were these sample(s)	le(s) or method blank(s) reanalyzed?	ed?			×
6.4	If No in Section	If No in Section 6.3, is any sample dilution	ution factor greater than 10? (Su	factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> UCL	10% to LCL	<10%			
	Positive	J	ſ	-			
	Non-detect	None	UJ	R		İ	

Note:

7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	e Ž	<b>V</b>
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
	Are MS/MSDs analyzed at the required frequency of one matrix snike ner ten samples and a dunlicate ner truenty for each			
7.2	matrix?			×
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
				•
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other OC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix Recoveries < 10% may			
	fill 0/01 collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the collection of the co			
	require rejection. RPD tailures may be flagged "J" (+ only)			

Note:

8/7/2006

		Yes	Š	NA
8.1	Is an LCS recovery form present?	×		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL, 1(+) only; <lcl, "j"="" (+="" 1(+)="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

### 9.0 TCL Identification (Code W)

		3	2	WI	
	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing				_
9.1	calibration?			×	
		CONTROL OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SECURIOR OF A SEC			

Note:

## 10.0 TCL Quantitation and Reported Detection limits (Code P)

		r es	NO NA	<b>∀</b> Z
10.1	Are RLs used consistent with those specified in the QAPP?			×
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			*
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
10.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

## 11.0 Field Duplicate Samples (Code F)

		S	20	AN
11.1	Were any field duplicates submitted for herbicide analysis?	X		
:	TANK TO THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY			
7.11	were all KPD or absolute difference values within the control limits outlined in the QAPP?	×		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Samples GM-19A and SA-0-3 were submitted as the parent samples for GM-19A-D and SA-0-3-D.

#### 12.0 Data Completeness

			Yes	N ₀	AN
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	soil	X		
12.2	12.2 Number of samples:				
12.3	12.3 Number of target compounds in each analysis:				
12.4	Number of results rejected and not reported:				
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness				

## DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

	-		
Keviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
Date:	9/16/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 030
		Review Level	Level III

#### Major Anomalies:

No samples were rejected

#### Minor Anomalies:

Samples were qualified based on blank contamination and MS/MSD recoveries.

Field IDs:	SA-0-1	SA-0-2	GM-19A
	GM-19A-D	SA-0-3	SA-0-3-D
	GM-19C	SA-Q-5	SA-Q-7
	SA-Q-8	SA-Q-4	SA-Q-6
	SA-Q-3	SA-Q-2	

## 1.0 Chain of Custody/Sample Condition/Raw Data

			IC.	-	ICF-IVIS	27	OL	OFAA		CVAA-HB	26 L
		Yes	2 8	AYe	% %	NA	Yes No NA Yes No NA Yes No NA Yes No NA	N o	Yes	No	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	×						╀	×	8353	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X						├	×		
	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample			-				30.			
1.3	receipt, condition of samples, analytical problems or special circumstances affecting the quality	×						L.		×	
	of the data?										
14	Does sample preservation, collection and storage meet method requirement? (water samples:					1000					
1.1	with Nitric Acid to pH < 2, and soil/sediment samples: $4 \cdot C + 2 \cdot C$ )	×							×	0.1100	
	Are the digestion logs present and complete with pH values, sample weights, dilutions, final							<u> </u>			
1.5	volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete	X			2.00				×	10000	
i	documentation, contact the laboratory for explanation/resubmittal.		-			25.7 060					

Note: The laboratory case narrative indicated that the MS/MSD had recoveries outside the QC limits.

The narrative also indicated that the method blank had detections above the MDL.

#### 2.0 Holding Time (Code H)

	I	ICP	I	ICP-MS	S	Ð	GFAA		CVAA-Hg	-Hg
	es N	lo NA	Yes	No	NA 3	(es	N N	Yes No NA Yes No NA Yes No NA Yes	No	VN (
Have any technical holding times, determined from date of collection to date of analysis, been								_		
exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		×							×	
Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)	200								L	
J(+)/R(-).						734				100,000

Note:

2.1

## 3.0 Instrument Calibration (Code C)

							ICP		ICP-MS		GFAA	A	CA'	CVAA-Hg	8
			ļ			Yes	No NA Yes	4 Yes		No NA Yes	$\overline{}$	No NA Yes		No	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard: GFAA: blank + three standards; CVAA: blank + five standards)	cluded in the dards; CVAA:	calibration curve' blank + five stan	? (ICP/ICP-MS: bl dards)	ank + one standard;		×								
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).	ients > 0.995?	(for GFAA and 0	CVAA) Action: J(-	+)/UJ(-).									╁╴	×
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	verification (IC	CV) analyzed at the mine affect on the	ne beginning of eac e data and note in r	h analysis? Action: eviewer narrative.		×								×
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.		(CCV) performe no, use profession	d every 10 analysi nal judgment to det	on (CCV) performed every 10 analysis or every 2 hours, If no, use professional judgment to determine affect on the		×								×
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	ard percent re	ecoveries (ICV a (90%-110%).	nd CCV) within	the control limits?		×								×
	Action:	R(+/-)	J(+)/(1)(-)	J(+)	R(+)										
	Mercury	< 65%	65% - 79%	121% - 135% > 135%	> 135%										
	Other Metals	< 75%	75% - 89%	111% - 125% > 125%	> 125%									$\vdash$	

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP	I	ICP-MS		GFAA		CVAA-Hg	-Hg	l
		Yes ]	No NA Yes	Yes	No NA Yes	Yes	No NA Yes	IA Ye	s No	NA	⋖
1 7	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per										l
-	batch, per matrix and per level)?	ж							×		
4.7	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are										
7:-	determined for positive and negative blank values.	×						_	×	\$\$\$\$\circ\	
7 3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to		L								
j.	determine affect on the data note in reviewer narrative.	×					-		×		
	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours									L	Γ
4.4	whichever is more frequent? Action: If no, use professional judgment to determine affect on the x	. <b>14</b>							×		
	data to note in reviewer narrative.								<i>\$</i> 1.		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank										Γ
}	value are determined for positive and negative blank values.	×							×	<b>8</b> 05	
46	Are there samples with concentrations less than five times the highest level in associated blanks?				875 Sel-			H			
2.	Action: If yes, U at reported concentration.		×						×		
4.7	Are there samples with non-detect results or with concentrations less than five times the most										Ī
}	negative value in associated blanks? Action; If yes, J(+)/UJ(-).		<b>X</b>						×		
								1		ı	

Note: Several target analyte values were detected above the IDL. Qualifications are listed below.

<u>e</u>										
Code	P	P	P	P	P	P	Ь	Ь	Ь	Ь
New RL	•		•	1			•			
Qualification	Ω	Ω	Ω	Ω	Ω	D	Ω	Ω	Ω	n
Analyte	Cobalt	Chromium	Chromium	Chromium	Chromium	Chromium	Chromium	Chromium	Chromium	Chromium
Field ID	SA-0-1	GM-19A	GM-19A-D	SA-0-3	SA-0-3-D	GM-19C	SA-Q-7	SA-Q-4	SA-Q-6	SA-Q-2

## 5.0 ICP Interference Check Sample (ICS) (Code N)

CVAA-Hg

GFAA

ICP-MS

ICP

Ž		_					
1							
Ž							
Yes							
ž							
ž							
Yes No NA Yes No NA Yes No NA Yes No							
NA							
N.		4.4.500	- C		6/800		
Yes							
NA	×	×	×	×			
ľ		Z 1884			See See	383×5	
Yes							
	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	5.2 Are the ICS AB recoveries within 80% - 120%?	5.3 Are the results for unspiked analytes (in ICS A) < + IDL?	5.4 If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)	<-IDL > IDL <50% 50% -79% >120%	UJ(-) $J(+)$ $R(+/-)$ $J(+)/UJ(-)$ $J(+)$

Note:

# 6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

								ICF		ICF-M	ICF-MS	GFA	GFAA	CVAA-Hg	A-H	50
	i						Yes	No	A Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA	s No	NA	Yes	S.	ΑN
6.1	Was an LCS	S prepared and	analyzed at the	correct freque	ency (one per 20	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per	-	-							<del> -</del>	T
1:0	matrix and r	per level)? Ac	matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	any sample no	ot associated with	LCS results.	×		ij.	media				×		
63	Is any LCS	recovery outsi	ide the control lin	nits? (Aqueo	ws limits: 80% -	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and	-									
7.0	Sb; Solid lin	Sb; Solid limits: as per EPA-EMSL/I	A-EMSL/LV)			•		×					12		×	
	Action:	So	Solid		Aqueous											
		< TCT > ACT	> UCL	< 50%	50% - 79% > 120%	> 120%										
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)							21580			

Note:

## 7.0 Laboratory Duplicates (Code K)

			ICP	$\parallel$	ICP-MS		GFAA	$\vdash$	CVAA-Hg	A-Hg	20
		Yes	Yes No NA Yes No NA Yes No NA Yes No NA	Yes	NoN	A Yes	No	NA Ye	\ S	0}	¥
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,									-	Ī
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes x	×							×		
	not associated with Duplicate results.					***	- 53	1108			
7	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional									3	Τ
7:/	judgment. Note in worksheet.	<u>:0301</u>	×						Velta i	bet A	
7.3	Are all analyte duplicate results within control? (RPD values < 20% or difference < + PQL for							agne Frank			T
	aqueous, and RPD < 35% or difference < ±2 X PQL for solids) Action: If no, J(+).	×					886:3		×		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.		_							╁	Ī
Note:	All RPDs were within criteria, samples SA-0-1, GM-19A, and SA-Q-2 were used as the duplicate sample.	Sample								-	

All RPDs were within criteria, samples SA-0-1, GM-19A, and SA-Q-2 were used as the duplicate sample.

# 8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

						ICP	_ 	ICP-MS	L	GFAA		CV.	CVAA-Hg	500
					Yes	No N	No NA Yes		No NA Yes		No NA Yes	$\overline{}$	No	NA
	Was a spiked	sample prepared and	analyzed at the correct fre	Was a spiked sample prepared and analyzed at the correct frequency (one per 20 samples, per									┝	Γ
8.1	batch, per mat	trix and per level)? ,	Action: If no, J(+), with pre	batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not x	×			Jere		14 - 3		×		
	associated with	associated with matrix spike results.												
6.0	Was a field bl	ank used for the MS	analysis? Action: If yes,	Was a field blank used for the MS analysis? Action: If yes, J(+) with professional judgment.										
7:0	Note in worksheet.	heet.			159	¥4							×	
	Note: Matrix	Note: Matrix spike analysis may be	be performed on a field bla	performed on a field blank when it is the only aqueous	560		_		L					
	sample in an SDG.	DG.	·	•	04850		_				_			
	For all analyte	s with sample concer	ntration < 4 x spike concentr	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within				alasta (			537%			Ī
8.3	the control lin	the control limit of 75-125%? (No	o control limit applies to at	control limit applies to analytes with concentration > 4 x		×		2.2.				×		
	spike concentration.)	ation.)						- 1						
		%R > 125%	30% < %R < 74%	%R < 30%				200.20						
	Positive	ſ	J	J				5.600000						
	Non-detect	None	UJ	R		_								<u> </u>

Sample SA-0-1 was spiked and analyzed, with recoveries outside QC limits. Qualifications are listed below. Note:

		_	7
MS/MSD limits	75-125	75-125	
MS/MSD Recovery	116/128	125 / 133	
Analyte	Manganese	Sodium	
Field ID	SA-0-1	SA-0-1	

900000	,	_
Code	M	M
Qualification	ſ	ſ
Analyte	Manganese	Sodium
Field ID	SA-0-1	SA-0-1

## 9.0 Instrument Detection Limits (IDL)

			ICP	I	ICP-MS	S	GF	GFAA	၁	CVAA-H	Hg
		Yes	No NA	Yes	No	NA Y	es	√N o	Yes	ž	NA
9.1	Are all IDL equal to or less than the reporting limits specified?		×								×
Moto.								$\ $			

### 10.0 ICP Serial Dilutions (Code S)

		Yes No NA Yes No NA Yes No NA Yes No NA Yes No	NO NA	Yes	No	NA	Yes	No.	NA Y	es 📗	9	NA
10.1	Were serial dilutions performed?	×	$\vdash$			T	<u> </u>	L	†		$\vdash$	
10.2	10.2 Was a five-fold dilution performed?	×	_			T :			T		$\dagger$	
10.3	Did the serial dilution results agree within 10% for analyte concentration $> 50 \times 10$ in the original sample? If no, $J(+)$ .	X						-			$\vdash$	
Note:	Note: Samples SA-0-1 GM-194 and SA-0-2 were diluted and analyzed all 92Ds was within OC limits					1		┨		1	1	1

CVAA-Hg

GFAA

ICP-MS

ICP

11.0 Field Duplicate Samples (Code F)

		ICP	I	ICP-MS	S	GF	GFAA	) 	CVAA-Hg	Hg
	Yes	No	No NA Yes No NA Yes No N	No	NA Y	es	N of	NA Yes	_N	AN
Were any field duplicates submitted for metal analysis?	×	-		0.000			-	×		
Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or		f					ļ		1 1 1000	
difference $< \pm 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< \pm 4 \times PQL$ )	×							×	279606	

Note: Sample GM-19A and SA-0-3 were submitted as the parent samples for GM-19A-D and SA-0-3-D

### 12.0 Result Verification (Code Q)

		Yes	No NA	Yes	ž	NA Yes	%	NA.	Yes ]	۶ چ	AA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?		×					3:		t	×
12.2	Were all dilution reflected in the positive results and detection limits?		×					34 .22		╁	×
Note.										1	

CVAA-Hg

**GFAA** 

ICP-MS

ICP

Note:

#### 13.0 Data Completeness

	II -	-					-	Γ
13.1	us a completeness within the control limits? (Control limit: Check QAPP or use 93% for							
1.5.1	aqueous sample, 90% for soil sample)			-				
13.2	13.2 Number of samples:	14	0	0	•	14		
13.3	13.3 Number of target compounds in each analysis:	2	c	c		-	$\frac{1}{1}$	T
		1		>		1		
13.4	13.4 Number of results rejected and not reported:	0	0	0		0		
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$	Τ					+	Τ
		Ī						7
	% Completeness	100	####	####		90		

#### DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
Date:	7/11/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 030
Test Name:	Ammonia, Chloride, Nitrogen, Sulfate, TOC, dissolved gases	Review Level:	Level III
Method No.:	350.1, 325.2, 353.2, 375.4, 415.1, RSK-175	1	

#### Major Anomalies:

No samples were rejected

#### Minor Anomalies:

Samples were qualified based on MS/MSD recoveries.

GM-19A	SA-0-3-D	SA-Q-7	SA-Q-6	
SA-0-2	SA-0-3	SA-Q-5	SA-Q-4	SA-Q-2
SA-0-1	GM-19A-D	GM-19C	SA-Q-8	SA-Q-3
Field IDs:				

## 1.0 Chain of Custody/Sample Condition

		3	¥
1.1	Do Chain-of-Custody forms list all samples analyzed?	Λ	
,		•	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Ā	
-	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples		
L.1	analytical worklams on marrial similarity of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the contraction of the co	>	
	analy usar problems of special circumstances affecting the quality of the data?	∢	
, ,			
Note:	The narrative indicated that the MS/MSD recoveries for ammonia were outside OC limits		

The narrative indicated that the MS/MSD recoveries for ammonia were outside QC limits.

## 2.0 Holding Time/ Preservation (Code H)

		Ies	ONI	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".	•		
٠,٢	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	
			March 177 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

			x es	_ 0 V	A A
	3.1	Is a Method Blank Summary form present for each batch?	X		
	3.2	Do any method blanks have positive results?		X	
_	3.3	Do any field/rinse/equipment blanks have positive results?		X	
		Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
		RL for estimate (laboratory "J" flagged) concentrations.	•		
	3.4	If Level IV, review raw data and verify all detections for blanks were reported.			
	Moto.				

Note:

## 4.0 Initial Calibration (Code C)

		S	AN.
4.1	Are Initial Calibration summary forms present and complete for each instrument used?		×
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?		*
			4
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".		
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.		

## 5.0 Continuing Calibration (Code R)

		Yes	No No	NA
5.1	Are Continuing Calibration Summary forms present and complete?			X
5.2	Has a continuing calibration standard been analyzed every 10 samples?			×
5.3	Do any analytes have a %R outside QC limits (80-120%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R.			
5.4	If Level IV, calculate a sample of %Rs.			

Note:

# 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		S	2	<b>Y</b>
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	×		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

The ammonia MS/MSD sample had recoveries outside QC limits. Qualifications are listed below. Note:

-	
Code	M
Qualification	ſ
Analyte	Ammonia
Field ID	SA-0-1

		Yes	N _o	NA
7.1	Is an LCS recovery form present?	X		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
:	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

### 8.0 Analyte Identification

	1	res	ON	AN
~	1s the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT	•		
	in the continuing calibration?			×

Note:

## 9.0 Analyte Quantitation and Reported Detection limits

		Yes	°Z	Y V
9.1	Are RLs used consistent with those specified in the QAPP?			×
(				
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			*
				4
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			*
				∢
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

8/7/2006

## 10.0 Field Duplicate Samples (Code F)

		Yes	S O	AN A
10.1	Were any field duplicates submitted?	Х		
10.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?	X		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Samples GM-19A and SA-0-3 were submitted as the parent samples for GM-19A-D and SA-0-3-D. Note:

## 11.0 Laboratory Duplicates (Code K)

		Yes	No	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		X	
11.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for aqueous, and RPD $< 35\%$ or difference $< \pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are $> 5$ X IDL.	×		

Samples SA-Q-8, GM-19C, SA-Q-4, SA-0-02, and GM-19A were analyzed in duplicate. Note:

#### 12.0 Data Completeness

				1111
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	sample, 90% for soil		
	sample)	,	X	
12.2	Number of samples:	9		
12.3	Number of target compounds in each analysis:	1		
12.4	Number of results rejected and not reported:	0		
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$			
	% Completeness	001		

		,

#### 9000/2/

# DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:Bart BrandenburgDate:9/19/2005LaboratorySevern Trent Laboratory - Savannah

Project Name:
Project Number:
SDG No.:

Review Level:

Sauget - Area 2 21561510.60011 SAS 031 Level III

Major Anomalies:

No samples were rejected

Minor Anomalies:

Field IDs:

Samples were qualified based on trip blank contamination.

SA-Q-16 SA-Q-13 GM-4B TB-33 GM-7 TB-34 SA-Q-10 SA-Q-11 GM-4-A GM-17C MW-3C MW-7B SA-Q-15 SA-Q-14 SA-Q-1 SA-Q-9 MW-7C GM-3

# 1.0 Chain of Custody/Sample Condition

		1 63	2	W
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	۲		
-	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples.			
۲. <del>۱</del>	analytical problems or special circumstances affecting the quality of the data?		×	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

# 2.0 Holding Time/ Preservation (Code H)

					res	001	NA
2.1	Do sample preservat	Oo sample preservation, collection and storage	age condition meet method requirement?	hod requirement?	¥		
	If sample preservation	f sample preservation and/or temperature was i	as inappropriate (i.e.,	nappropriate (i.e., <2°>6°C, etc.), comment in report. If unpreserved or			
	temperature is outsic	le the range 0° (but not	frozen) to 10° flag all	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds	temperature exceeds 10°, flag positive detections "J" and non-detects "R".	tions "J" and non-deter	cts "R".		•	
2.2	Have any technical h	nolding times, determine	ed from sampling to da	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		X	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
·	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical h	Have any technical holding times been grossly	sly (twice the holding 1	(twice the holding time) exceeded? If yes, J(+)/R(-).	7.10	X	

Note:

# 3.0 GC/MS Instrument Performance Check (Code T)

		1 63	ONT	WN .
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			X
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			×
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no, flag R.			X
		**************************************		

Note:

# 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

<ul> <li>4.1 Is a Method Blank Summary form present for each batch?</li> <li>4.2 Do any method blanks have positive VOA results (TCL and/or TIC)?</li> <li>4.3 Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?</li> <li>Action: Positive sample results &lt;5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.</li> <li>4.4 If Level IV, review raw data and verify all detections for blanks were reported.</li> </ul>			Yes	AZ OZ	₹ Z
4.2 Do any method blanks have positive VOA results (TCL and/or TIC)?  4.3 Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?  Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.  4.4 If Level IV, review raw data and verify all detections for blanks were reported.	4.1	Is a Method Blank Summary form present for each batch?	X		
Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.  4.4 If Level IV, review raw data and verify all detections for blanks were reported.	4.2	Do any method blanks have positive VOA results (TCL and/or TIC)?		*	
Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.  4.4 If Level IV, review raw data and verify all detections for blanks were reported.	4.3	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	×		
butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory  "J" flagged) concentrations.  4.4 If Level IV, review raw data and verify all detections for blanks were reported.		Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
"J" flagged) concentrations.  4.4 If Level IV, review raw data and verify all detections for blanks were reported.		butanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
4.4 If Level IV, review raw data and verify all detections for blanks were reported.		"J" flagged) concentrations.			
	4.4	If Level IV, review raw data and verify all detections for blanks were reported.	i		×

The two trip blanks submitted had detections above the MDL. Qualifications are listed below.

Field ID	Analyte	Qualification	New RL	Code
SA-Q-9	Dibromochloromethane	Ω	•	Y
SA-Q-9	Bromoform	n ·		Y
GM-4A	Bromoform	Ω	-	Y

# 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			X
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders like ketones or alcohols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			
NI-4				

#### Note:

# 6.0 Continuing Calibration (Code C)

		Yes	No	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $< 20\%$ )?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			X
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

## 7.0 Surrogate Recovery (Code S)

					S	2	MA
7.1	Are all sample	es listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Form?	X		
7.2	Are surrogate	recoveries within acceptal	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	P for all samples?	X		
7.3	If No in Secti	on 7.2, were these sample(	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	d?			×
7.4	If No in Secti	on 7.3, is any sample dilut	ion factor greater than 10? (Sur	If No in Section 7.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
	Note: If SMC	recoveries do not meet ac	cceptance criteria in samples cho	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	equired.		•	•		
		> UCL	10% to LCL	<10%			
	Positive	J	ſ	ſ			
	Non-detect	None	UJ	<b>X</b>			

Note

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		res	No NA	<b>V</b>
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	Ÿ		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample MW-3C was spiked and analyzed as the MS/MSD.

# 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	ŝ	A V
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	Х		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	¥		
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Artion for energific commoning article the accountance with a 10/10-11/01			
	Accounted specials compound outside the acceptance criteria: 70K/UCL,			
	J(+) only; $L(-1)$ , $J(+)/UJ(-)$ ; $J(-1)$ , $J(-1)$ , $J(-1)$ . RPD failures should be flagged "J" $J(-1)$ only)			

## 10.0 Internal Standards (Code I)

					ıcs	9	¥.
10.1	Are internal standa	Are internal standard areas for every sample and blank within upper and lower QC limits?	lank within upper and lowe	er QC limits?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	ſ	ſ			
	Non-detect	None	UI	R			
	The method specifi	cation is for the continuing cali	bration to be compared to	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibrat	ion. Thus, if all other QC speci	fications are met for a give	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional		·	
	judgment, the revie	udgment, the reviewer may choose not to flag individual samples in this case.	ividual samples in this case	à			
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	seconds of the associated	calibration standard?	X		
	Action: The chron	natogram must be examined to o	letermine if any false posit	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large			
	magnitude, the rev	iewer may consider partial or to	tal rejection of the data for	magnitude, the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.			

Note:

## 11.0 TCL Identification (Code W)

		Yes	S N	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			×
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			x

Note:

# 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		ទ	<b>V</b>
12.1	Are RLs used consistent with those specified in the QAPP?		×
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?		×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations		

# 13.0 Field Duplicate Samples (Code F)

		Ies	ONI	NA
13.1	Were any field duplicates submitted for VOC analysis?		×	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Noto

#### 14.0 Data Completeness

			Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	ole, 90% for soil	X		
14.2	Number of samples:	18			
14.3	Number of target compounds in each analysis:	33			
14.4	Number of results rejected and not reported:	0			
	% Completeness = 100 x ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)				
	% Completeness	00			

#### 8/7/2006

# DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Project Number: Project Name: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 9/19/2005 Laboratory Reviewer: Date:

Sauget - Area 2 21561510.60011 SAS 031 Level III

Review Level:

Major Anomalies:

Samples were rejected based on holding times

Minor Anomalies:

Field IDs:

Samples were qualified based on surrogate recoveries.

)-WS	2-1	SA-Q-10	SA-Q-13
SA-Q-9	6-6	SA-Q-11	SA-Q-16
SA-C	)-14	GM-4A	GM-4B
SA-C	)-15	GM-17C	GM-3
MW-	-3C	GM-7	MW-7C
-MM	-7B		

# 1.0 Chain of Custody/Sample Condition

1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×		
7	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples.			
1.3	analytical problems or special circumstances affecting the quality of the data?	×		
			Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Company of the Compan	

Yes

Note: Samples were reanalyzed outside of holding time.

The MS/MSD and surrogates had recoveries outside QC limits.

# 2.0 Holding Time/ Preservation (Code H)

7 1		Yes	No	NA
2.1 Do sam	Do sample preservation, collection and storage condition meet method requirement?	Х		
If samp	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10			
⁰ C), the	^o C), then flag all positive results with a "J" and all non-detects "UJ".			
Have an	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table			
for sam	for sample holding time) If yes, J(+)/UJ(-).	×		
Extracti	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3 Have ar	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).	X		

Samples had to be reanalyzed outside of holding time due to surrogate recoveries outside QC limits. Qualifications are listed below. Note:

	<del></del>	_	r	
Code	H	Η	Н	Н
Days late	29	29	29	29
Qualification	R	R	R	R
Analyte	All SVOCs	All SVOCs	All SVOCs	All SVOCs
Field ID	SA-Q-1RE	SA-Q-1REDL	SA-Q-15RE	MW-7BRE

# 3.0 GC/MS Instrument Performance Check (Code T)

		3	
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?		×
3.2	Have all samples been analyzed within twelve hours of the tune?		x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".		
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?		×
	If no, all standards, blanks, field samples and QC samples are rejected "R".		

# 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		Ŝ	017	4
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		X	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		X	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the			
	detection limit elevated to the RL for estimate concentrations.			•
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

# 5.0 GC/MS Initial Calibration (Code C)

		CA T	211	1177
	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like			
?	amines and phenols)? If yes, J(+)/R(-).	20.15		×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

Note:

# 6.0 Continuing Calibration (Code C)

		3	V.
6.1	Are Continuing Calibration Summary forms present and complete?		×
6.2	Has a continuing calibration standard been analyzed every 12 hours?		
			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.		×
	D		
79	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration		
<u>+</u>	RRF outside QC limits (%D < 20%)?		×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.		
	4		
6.5	Do any compounds have an RRF $< 0.05$ (use 0.01 for poor responders)? If yes, $J(+)/R(-)$ .	1273	×
,			
9.9	It Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.		

## 7.0 Surrogate Recovery (Code S)

					res	ONI	NA
7.1	Are all sampl	es listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	Form?	X		
7.2	Are surrogate	recoveries within acceptan	ce criteria specified in the QAP	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?		×	
7.3	Are more than	one of either fraction outs	Are more than one of either fraction outside the acceptance criteria?		x		
7.4	If Yes in Sect	ion 7.3, are these sample(s)	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?	Č		×	
7.5	If Yes in Sect	If Yes in Section 7.3, is any sample dilution factor greater than 10?	ion factor greater than 10?				×
	Note: If SMC	recoveries display unaccep	otable recoveries in the MS and	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and			
	acids and base	acids and base/ neutrals are assessed separately.	ırately.				
		> UCL	10% to LCL	<10%			
	Positive	J	J	ſ			
	Non-detect	None	UJ	Я			

Several samples had surrogate recoveries below QC limits. Qualifications are listed below. Note:

Code	S	S	S
Qualification	tU/t	J/UJ	J/R
Analyte	All acid fraction SVOCs	All acid fraction SVOCs	All SVOCs
Field ID	SA-Q-1	SA-Q-15	MW-7B

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		E E		NA V
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	Х		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria			
	and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require			
	rejection. RPD failures may be flagged "J" (+ only)			

Several analytes were outside QC limits for the MS/MSD sample MW-3C; however, the LCS recoveries were within QC limits. No qualification of data was required. Note:

# 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

			2.1	4717
9.1	Is an LCS recovery form present?	X		
9.2	Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	X		į
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).="" rpd<="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
	failures should be flagged "J" (+ only)		-	
9.4	If Level IV, verify the % recoveries are calculated correctly.			

Note:

## 10.0 Internal Standards (Code I)

					X es	No	N V
10.1	Are internal standar	d area of every sample and blan	k within upper and lower	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?	X		
		Area > +100%	Area < -50%	Area < -10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	UJ	R			
	The method specific	cation is for the continuing calib	ration to be compared to the	The method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibrati	on. Thus, if all other QC specifi	cations are met for a giver	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the			
	reviewer may choos	reviewer may choose not to flag individual samples in this case.	in this case.			_	
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	econds of the associated c	alibration standard?	×		
	Action: The chrom	atogram must be examined to de	stermine if any false positi	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude,			
	the reviewer may co	the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	of the data for non-detects	in that sample/fraction.			

Note:

## 11.0 TCL Identification (Code W)

		31	2	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			×
		TOWN.		
. 11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do			
7:11	sample and standard relative ion intensities agree within 30%?			×

# 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		153	ONI	INA
12.1	Are RLs used consistent with those specified in the QAPP?			х
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			Х
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			-

Note:

# 13.0 Field Duplicate Samples (Code F)

13.1	Were any field duplicates submitted for SVOC analysis?		Х	
		2.7.1.00.1.00.00.00.00.00.00.00.00.00.00.00		
13.2	Were all RPD or absolute difference values within the control limits?			Х
		20000000000000000000000000000000000000		
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

#### 14.0 Data Completeness

			Yes	No No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	mple)	X		
14.2	Number of samples:				
14.3	Number of target compounds in each analysis:				
14.4	Number of results rejected and not reported:				
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$	i			
_	% Completeness				

### DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

21561511.60011 Sauget - Area 2 SAS 031 Level III Project Number: Project Name: Review Level: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 9/19/2005 Laboratory Reviewer: Date:

Major Anomalies:

No samples were rejected.

#### Minor Anomalies:

Samples were qualified based on surrogate recoveries.

Field IDs:	SA-Q-1	SA-Q-10	SA-Q-13
	SA-Q-9	SA-Q-11	SA-Q-16
	SA-0-14	SA-0-15	

## 1.0 Chain of Custody/Sample Condition

		3	2	¥.
1.1	Do Chain-of-Custody forms list all samples analyzed?	×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
13	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of		34	
13	samples, analytical problems or special circumstances affecting the quality of the data?	×		

The laboratory case narrative indicated that the LCS and surrogate recoveries were outside QC limits. Note:

## 2.0 Holding Time/ Preservation (Code H)

		Yes	No NA	Y Z
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
ιι	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		A	
		35	4	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	Yes	Yes No	A
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results (TCL)?		Х	
3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		Х	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note

# 4.0 GC/ECD Instrument Performance Check (Code B)

		S	2	W
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			x
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			x
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			x
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

### 5.0 Initial Calibration (Code R)

		1 53	0	T/VI
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

### 6.0 Continuing Calibration (Code C)

		x es	res No NA	NA
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits $(\%D < 15\%)$ ?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.			

Note:

### 7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sampl	es listed on the approp	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?	ımary Form ?	X		
7.2	Are surrogate	recoveries within acc	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	e QAPP for all samples?		×	
7.3	If No in Secti	If No in Section 7.2, were these san	hese sample(s) or method blank(s) reanalyzed?	nalyzed?			×
7.4	If No in Secti	If No in Section 7.3, is any sample	dilution factor greater than 10	sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			
		> UCL	10% to LCL	<10%			·
	Positive	J	J	I.			
	Non-detect	None	UJ	R			:

Surrogate recoveries for two pesticide samples were outside QC limits. Qualifications are listed below. Note:

			_
Surrogate Limits	30-150	30-150	
Surrogate Recoveries	6	11	
Surrogate	DCB Decachlorobiphenyl	DCB Decachlorobiphenyl	
Field ID	SA-Q-1	SA-Q-14	

Code	S	S
Qualification	J/R	fΩ//f
Analyte	All Pesticides	All Pesticides
Field ID	SA-Q-1	SA-Q-14

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	ទ	TES ON COL	V
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10%			
	may require rejection. RPD failures may be flagged "J" (+ only)		•	

Note:

# 9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	Yes No NA	A V
9.1	Is an LCS recovery form present?	×		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,   J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)			
Note:	The LCS had recoveries above QC limits. All associated data was reported as non-detect. No qualification of data was required.	quired.		

The LCS had recoveries above QC limits. All associated data was reported as non-detect. No qualification of data was required.

### 10.0 TCL Identification (Code W)

		res	NO	NA
101	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the			
10.1	continuing calibration?			×

Note:

# 11.0 TCL Quantitation and Reported Detection limits (Code P)

11.1	Are RLs used consistent with those specified in the QAPP?		Х
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		X
		- A & CONTROLOGY   CA THON THE	
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		×
11.4	If Level IV, calculate a sample of positive results to verify correct calculations		

## 12.0 Field Duplicate Samples (Code F)

		r es	_ 0 _	
12.1	Were any field duplicates submitted for analysis?		×	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

#### 13.0 Data Completeness

		Yes	N ₀	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	oil x		
13.2	Number of samples:			
13.3	Number of target compounds in each analysis:			
13.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			
	% Completeness 100			

#### DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Project Number: Project Name: Bart Brandenburg 9/19/2005 Reviewer: Date:

Severn Trent Laboratory - Savannah Laboratory

21561510.60010 Sauget - Area 2

SAS 031 Level III

Review Level:

SDG No.:

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification in this SDG.

SA-Q-11 SA-Q-10 SA-Q-1 SA-Q-9

Field IDs:

SA-Q-13 SA-Q-16 GM-4B

> GM-17C GM-4A

GM-7

MW-7C GM-3

MW-7B

SA-Q-14 SA-Q-15 MW-3C 1.0 Chain of Custody/Sample Condition

		~ ~	<b>&gt;</b>	
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	Х		
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
L.1	analytical problems or special circumstances affecting the quality of the data?		¥	

# 2.0 Holding Time/ Preservation (Code H)

		3		C
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
ιι	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).	<u> </u>	X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		1 53		TAN.
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	·
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.		-	i

Note

## 4.0 Initial Calibration (Code R)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

# 5.0 Continuing Calibration (Code C)

		res	res No	Y.
5.1	Are Continuing Calibration Summary forms present and complete?			×
5.2	Has a continuing calibration standard been analyzed every 12 hours?			*
5.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $<$ 20%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
5.4	If Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.			

Note:

## 6.0 Surrogate Recovery (Code S)

					Yes	°Z	Y Y
6.1	Are all sampl	es listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	ry Form?	×		
6.2	Are surrogate	recoveries within acceptar	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	APP for all samples?	X		
6.3	If No in Secti	on 6.2, were these sample(	If No in Section 6.2, were these sample(s) or method blank(s) reanalyzed?	zed?			<b>×</b>
6.4	If No in Secti	on 6.3, is any sample diluti	ion factor greater than 10? (S	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			1
		> UCL	10% to LCL	<10%			
<del></del>	Positive	J	J	ſ			
	Non-detect None	None	UJ	R			

Note:

# 7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		ICS	0	MA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	¥		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each			
1	matrix?	¥		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	Þ		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other OC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)	_		

Note: Sample MW-3C was analyzed as the MS/MSD.

# 8.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
8.1	Is an LCS recovery form present?	X		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

## 9.0 TCL Identification (Code W)

		Yes	No	NA
0	ted compound within 0.06 RRT units of the standard RRT in the continuing			;
7.1	calibration?			<b>X</b>

Note:

# 10.0 TCL Quantitation and Reported Detection limits (Code P)

10.1	Are RLs used consistent with those specified in the QAPP?		x
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?	:	×
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		X
10.4	If Level IV, calculate a sample of positive results to verify correct calculations		

X A

Yes

Note:

# 11.0 Field Duplicate Samples (Code F)

11.1	Were any field duplicates submitted for herbicide analysis?	X	
11.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?		×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		

N A

Yes

#### 12.0 Data Completeness

			23	7.10	1112
121	Is % completeness within the control limits? (Control limit: Check QAPP or us	(Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	•		
1.77	sample)		•		
12.2	12.2 Number of samples:	9			
12.3	Number of target compounds in each analysis:	10			
12.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$				
	% Completeness	100			

#### DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

21561510.60011 Sauget - Area 2 SAS 031 Level III Project Number: Project Name: Review Level: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 9/19/2005 Laboratory Reviewer: Date:

Major Anomalies:

No samples were rejected

Minor Anomalies:

No samples required qualification

Field IDs:

SA-Q-16 SA-Q-13 GM-4B MW-7C GM-3 SA-Q-10 SA-Q-11 GM-17C GM-4A GM-7 SA-Q-14 SA-Q-15 8A-Q-9 MW-3C MW-7B SA-Q-1

1.0 Chain of Custody/Sample Condition/Raw Data

			ICP		ICP-MS	AS.	GF	GFAA		CVAA-Hg	H.
		Yes	No	JA Ye	s No	NA N	No NA Yes No NA Yes No NA Yes No	N or	A Yes	ž	NA
1.1	Do Chain-of-Custody forms list all samples that were analyzed?	×	-						×		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×	_						×		
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of	×								×	
	uic data;	5000				Jagor.		7			
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with	,							,		
	Nitric Acid to pH < 2, and soil/sediment samples: $4^{\circ}C \pm 2^{\circ}C$ )	•							4	V-CF	
-	Are the digestion logs present and complete with pH values, sample weights, dilutions, final		┢								
1.5	volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete	×							×		
	documentation, contact the laboratory for explanation/resulpmittal				N.					× 26	

The laboratory case narrative indicated that the method blank had detections above the MDL. Note:

#### 2.0 Holding Time (Code H)

		Yes	No NA	Yes	NO NA	Yes	Yes   No   NA   Yes   No   NA   Yes   No   NA   Yes   N	N S	NA	
2.1	Have any technical holding times, determined from date of collection to date of analysis, been								HV mild	_
7.7	exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.		×			<u> </u>		×	- Control	
	Action: J(+)/UJ(-). If the holding times are grossly exceeded (twice the holding time criteria)									_
	J(+)R(-).									

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

## 3.0 Instrument Calibration (Code C)

							ICP		ICP-MS		GFAA	A	CV,	CVAA-Hg	ಎ
						Yes	No NA Yes	4 Yes		No NA Yes		No NA Yes		N ₀	NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard; GFAA: blank + five standards)	ncluded in the	e calibration curve : blank + five stand	?? (ICP/ICP-MS: tards)	blank + one standard;		×								
3.2	Are the correlation coefficients > 0.995? (for GFAA and CVAA) Action: J(+)/UJ(-).	ients > 0.995	? (for GFAA and C	VAA) Action: J(	+)/UJ(-).									+	×
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	verification (	ICV) analyzed at 1 rmine affect on the	the beginning of e data and note in r	ach analysis? Action: eviewer narrative.		×			Cg*					×
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	on verification of Action: I narrative.	n (CCV) performe f no, use professio	ed every 10 analy anal judgment to d	performed every 10 analysis or every 2 hours, professional judgment to determine affect on the		×		g - v - s >						×
3.5	Are all calibration standard percent recoveries (80%-120%) and other Metals (90%-110%).	d percent recc	) s	CV) within the co	ICV and CCV) within the control limits? Mercury		_ ×							ļ	×
	Action:	R(+/-)	(-)f\/(+)f	J(+)	R(+)									$\perp$	
	Mercury	< 65%	962 - 46%	121% - 135%	> 135%									┢	
	Other Metals	< 75%	75% - 89%	111% - 125%	> 125%				8-29					H	

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

		,	ICP	)I	ICP-MS	)	GFAA		CVAA-Hg	Яg
		Yes	No NA	NA Yes	No NA Yes		No NA Yes	A Yes	No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch per matrix and per level)?	×						X		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	×							X	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	<b>X</b> 0						X		
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	e <b>x</b>						X		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	k x							X	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.	j	X						X	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, $J(+)/UJ(-)$ .	at .	X						X	`

One target analyte was detected above the IDL; however, the associated sample values were greater than 5 times the blank results. No qualification of data was required. Note:

5.0 ICP Interference Check Sample (ICS) (Code N)

	Y					L				
	NA									
GFAA	No					r				
	Yes						<u> </u>			
_	ΑN									
ICK-IMS	°Z									
ر 	Yes No NA Yes No NA Yes No NA Y									
	ž	,	×	×	×	L	×			
7	ů.					L				
	Yes					30.00 market				
		Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the	beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	5.2 Are the ICS AB recoveries within 80% - 120%?	5.3 Are the results for unspiked analytes (in ICS A) < + IDL?		If not, are the associated sample Al, Ca, Fe, and Mg concentrations less than the level in the ICS?	Action: Not Spiked Analytes Spiked analytes (ICS AB analytes)	<-IDL > IDL <50% 50%-79% >120%	UJ(-) $J(+)$ $R(+/-)$ $J(+)/UJ(-)$ $J(+)$

No NA CVAA-Hg

Yes

# 6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

						•								I	
								ICP	I	ICP-MS		GFAA		CVAA-Hg	Hg
							Yes	No NA	Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA	No	AA Yes	ο̈́χ	NA
6.1	Was an LCS p	prepared and	analyzed at the	correct frequ	ency (one per 2	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per batch, per		<u></u>						S 15	
0.1	matrix and per	· level)? Act	matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	any sample no	t associated with	LCS results.	×					Arrison	¥	. 38	
63	Is any LCS rec	sovery outsic	is any LCS recovery outside the control limits?	nits? (Aqueou	s limits: 80% - 1	(Aqueous limits: 80% - 120% - except Ag and Sb;									
7.0	Solid limits: as per EPA-EMSL/LV)	s per EPA-E	MSL/LV)					×						M	
	Action:	Solid	lid		Aqueous										
		< CC > UCL	> UCL	< 20%	50% - 79% > 120%	> 120%						3.			
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)									

Note

## 7.0 Laboratory Duplicates (Code K)

			ICP		ICP-MS	S	GF	GFAA	၁	CVAA-Hg	Hg.
		Yes	No	IA Ye	Yes No NA Yes No NA Yes No NA Yes No NA	NA	Yes N	N ON	4 Yes	No	NA
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,		$\vdash$					<u> </u>		1,32.8	
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not	×			1358				×	10000	
	associated with duplicate results.			30	- 323						
7.7	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional	198									
7:7	judgment. Note in worksheet.		×							×	
7.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for			-		9					
j.	aqueous, and RPD < 35% or difference $< \pm 2$ X PQL for solids) Action: If no, J(+).	×				2 - 3	s (1)		×		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.										

Note: All RPDs were within criteria, sample MW-3C was used as the duplicate sample.

# 8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

						ICP		ICP-MS		GFAA		CVA	CVAA-Hg	
1					Yes	N N	No NA Yes		No NA Yes		No NA Yes		No NA	⋖
	Was a spiked	Was a spiked sample prepared and analyzed		at the correct frequency (one per 20 samples, per	7.			383.00					<u> </u>	Γ
8.1	batch, per mat	batch, per matrix and per level)? Action: If	Action: If no, J(+), with p	no, J(+), with professional judgment, analytes not	ot x			es aldes				×		
	associated with	associated with matrix spike results.	S.											
8	Was a field bl	Was a field blank used for the MS analysis?		Action: If yes, J(+) with professional judgment.	t								25.CSC 17.ESS	Γ
7:0	Note in worksheet.	neet.				×							×	
	Note: Matrix s	spike analysis may b	e performed on a field blank	Note: Matrix spike analysis may be performed on a field blank when it is the only aqueous sample	9		_		_	Š				l
	in an SDG.													
	For all analyte	s with sample conce	entration < 4 x spike concen	For all analytes with sample concentration < 4 x spike concentration, are spike recoveries within	п									Ī
8.3	the control lim	it of 75-125%? (No	control limit applies to anal	the control limit of 75-125%? (No control limit applies to analytes with concentration > 4 x spike	×			# Sh				×	_	
	concentration.)													*
		%R > 125%	30% < %R < 74%	%R < 30%				×. v						
	Positive	ſ	J	J										<u> </u>
	Non-detect	None	UJ	R										Γ

Note: Sample MW-3C was spiked and analyzed, all recoveries were within QC limits.

## 9.0 Instrument Detection Limits (IDL)

			ICP	) ]	ICP-MS		GFAA		CVAA-	A-Hg	
		Yes	No NA	Yes	No.	AA Yes	No.	NA Y	Se Se	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<u>₹</u>
9.1	Are all IDL equal to or less than the reporting limits specified?		×								×
2											1

Note:

## 10.0 ICP Serial Dilutions (Code S)

		Yes	N N	Yes No NA Yes	%	No NA Yes	S NC	o NA	No NA Yes No	No	NA
10.1	Were serial dilutions performed?	×	┢		1	-	_	_			
10.2	Was a five-fold dilution performed?	×	$\vdash$		1 (580)			-			
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the		+		1 ONL 10			-			
	original sample? If no, J(+).	×			· ·						

CVAA-Hg

GFAA

ICP-MS

ICP

Note: Samples MW-3C and SA-Q-13 were diluted and analyzed, all %Ds were within QC limits.

# 11.0 Field Duplicate Samples (Code F)

No NA Yes No N			ı
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	NA		×
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or a difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	ģ	×	
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	Yes		
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	NA		
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or a difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	2 Z		
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	Yes		
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	NA		
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	²	18061077	88.508.8 V ( ) 2.0
1.1 Were any field duplicates submitted for metal analysis? x   No NA    Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or   x    difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	Xes		
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	⋖		×
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% or difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	ž	×	
1.1 Were any field duplicates submitted for metal analysis?  Are all field duplicate results within control? (For aqueous sample, RPD values < 50% difference < ± 2 x PQL and for solids, RPD < 100% or difference < + 4 x PQL)	Yes		
11.1	7 197 (	Were any field duplicates submitted for metal analysis?	(For aqueous sample, RPD values 0% or difference < ± 4 x PQL)
		11.1	11.2

CVAA-Hg

GFAA

ICP-MS

ICP

Note:

### 12.0 Result Verification (Code Q)

			ICP		ICP-MS	S	GF.	GFAA	0	CVAA-Hg	Hg
		Yes	No N	NA Yes	No	NA Yes		No N	4 Yes	No	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?			<u>.</u>				_			×
12.2	Were all dilution reflected in the positive results and detection limits?	38	×	<u>.</u>						200	×
Note:											II I

#### 13.0 Data Completeness

13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous					-	
1.0.1	sample, 90% for soil sample)						-
13.2	13.2 Number of samples:	16	0		0	<u>.                                    </u>	19
13.3	13.3 Number of target compounds in each analysis:	22	0	1	0	<u>.                                    </u>	_
13.4	Number of results rejected and not reported:	0	0	· · · ·	0	<u> </u>	0
	% Completeness = $100 \times ((13.1 \times 13.2) - 13.3) / (13.1 \times 13.2)$			·		l	
	% Completeness	100	####		####		100

# DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

me: Sauget - Area 2		SAS 031	rel: Level III	
Project Name:	Project Number:	y - Savannah SDG No.:	Ammonia, Chloride, Nitrogen, Sulfate, TOC, dissolved gases Review Level:	5.4, 415.1, RSK-175
Reviewer: Bart Brandenburg	<b>Date:</b> 9/19/2005	Laboratory Severn Trent Laboratory - Savannah	Test Name: Ammonia, Chloride, N	Method No.: 350.1, 325.2, 353.2, 375.4, 415.1, RSK-175

#### Major Anomalies:

No samples were rejected

#### Minor Anomalies:

Field IDs:

Samples were qualified based on MS/MDS recoveries.

SA-Q-13	SA-Q-16	GM-4B	GM-3	MW-7C	
SA-Q-10	SA-Q-11	GM-4A	GM-17C	GM-7	
SA-Q-1	SA-Q-9	SA-Q-14	SAQ-15	MW-3C	MW-7B

# 1.0 Chain of Custody/Sample Condition

		1 63	7.7	T.
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples,			
C.I	analytical problems or special circumstances affecting the quality of the data?	×		

The laboratory case narrative indicated that the MS/MSD had recoveries outside QC limits. Note:

		X es	NO NA	A V
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
<i>( (</i>	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).		×	
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	

Note:

3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		x es	ONI	NA V
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			-
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

4.0 Initial Calibration (Code C)

		ı es	0 N	Y Y
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			*
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			*
				•
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

# 5.0 Continuing Calibration (Code R)

		31	V.
5.1	Are Continuing Calibration Summary forms present and complete?		X
5.2	Has a continuing calibration standard been analyzed every 10 samples?		×
5.3	Do any analytes have a %R outside QC limits (80-120%)?		×
·	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %R < 50%, flag R		
5.4	If Level IV, calculate a sample of %Rs.		

Note:

# 6.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	°Z	Y V
6.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
6.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
6.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may	••		
	require rejection. RPD failures may be flagged "J" (+ only)			

The MS/MSD sample MW-3C had recoveries outside QC limits. Qualifications are listed below. Note:

MS/MSD Limits	85-115	90-110
MS/MSD Recoveries	83 / 86	85 / 83
Analyte	Chloride	Ammonia
Field ID	MW-3C	MW-3C

		7
Code	M	×
Qualification	ſ	ſ
Analyte	Chloride	Ammonia
Field ID	MW-3C	MW-3C

		3	TES ON STA	MA
7.1	Is an LCS recovery form present?	×		
7.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
7.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
7.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			:
	J(+) only; $, J(+)/UJ(-); <10% J(+)/R(-). RPD failures should be flagged "J" (+ only)$		-	

Note:

#### 8.0 Analyte Identification

		Yes	S N	Y V
8	Is the relative retention time (RRT) of each reported compound (if applicable) within 0.06 RRT units of the standard RRT in			
1.0	the continuing calibration?			X

Note:

# 9.0 Analyte Quantitation and Reported Detection limits

		3	2	VI
9.1	Are RLs used consistent with those specified in the QAPP?			×
9.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			· ×
9.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
9.4	If Level IV, calculate a sample of positive results to verify correct calculations			

Note:

# 10.0 Field Duplicate Samples (Code F)

		Yes	°Z	Ϋ́Z
1 4 1				
10.1	Were any field duplicates submitted?		×	
10.2	Were all RPD or absolute difference values within the control limits outlined in the OA pp?			
				×
	Action for ensority community and the constant of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the form of the		Ī	
	Average for specific confidence due acceptance criteria: %ak>30 (water), %ak>100 (soil). J(+) only.			

Note:

8/7/2006

# 11.0 Laboratory Duplicates (Code K)

		ıes	0.0	NA
11.1	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples, per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes not associated with duplicate results.	X		
11.2	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional judgment. Note in worksheet.		×	
11.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \pm$ PQL for aqueous, and RPD $< 35\%$ or difference $< \pm$ 2 X PQL for solids)? Action: If no, J(+). Note: RPD criteria is used when both sample and duplicate results are $> 5$ X IDL.	Х		

Samples MW-3C, SA-Q-1, GM-17C, and MW-7B were analyzed as the laboratory duplicate samples. Note:

#### 12.0 Data Completeness

		Yes	No	NA
12.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	X		
12.2	Number of samples:			
12.3	Number of target compounds in each analysis:			
12.4	Number of results rejected and not reported:			
	% Completeness = 100 x ((12.1 x 12.2) - 12.3) / (12.1 x 12.2)			
	% Completeness			

# DATA VALIDATION WORKSHEET VOLATILE ORGANIC ANALYSIS

Reviewer:Bart BrandenburgDate:9/21/2005LaboratorySevern Trent Laboratory - Savannah

Project Name:
Project Number:
SDG No.:

Review Level:

Sauget - Area 2 21561510.60011 SAS 031 Level III

Major Anomalies:

No samples were rejected

#### Minor Anomalies:

Field IDs:

Samples were qualified based on blank contamination.

MW-5B	GM-18A-D	GM-17B	SA-P-2	SA-0-4
MW-5C	GM-18A	GM-6B	MW-3B	GM-6A
GM-5	GM-18B	TB-35	TB-36	TB-37

# 1.0 Chain of Custody/Sample Condition

		Yes	No	NA A
1.1	Do Chain-of-Custody forms list all samples analyzed?	X		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?		X	

Note: No anomalies were noted in the case narrative or cooler receipt forms.

# 2.0 Holding Time/ Preservation (Code H)

					S =	2	M
2.1	Do sample preservati	Do sample preservation, collection and storage condition meet method requirement?	e condition meet meth	od requirement?	Х		
	If sample preservatio	in and/or temperature was	s inappropriate (i.e., <	f sample preservation and/or temperature was inappropriate (i.e., <2° >6°C, etc.), comment in report. If unpreserved or			
-	temperature is outsid	le the range 0° (but not fro	ozen) to 10° flag all p	temperature is outside the range 0° (but not frozen) to 10° flag all positive results with a "J" and all non-detects "UJ". If			
	temperature exceeds 10°, flag positive d	10°, flag positive detection	etections "J" and non-detects "R".	s "R".			
2.2	Have any technical h	olding times, determined	from sampling to date	Have any technical holding times, determined from sampling to date of analysis, been exceeded? If yes, J(+)/UJ(-).		×	
	Matrix	Preserved	Aromatic	All others			
	Aqueous	No	7 days	14 days			
		Yes	14 days	14 days			
	Soil/Sediment	$4^{\circ}C \pm 2^{\circ}C$	14 days	14 days			
2.3	Have any technical h	olding times been grossly	y (twice the holding tir	Have any technical holding times been grossly (twice the holding time) exceeded? If yes, J(+)/R(-).		X	

Note:

# 3.0 GC/MS Instrument Performance Check (Code T)

		. Yes	ĝ	₹ Z
3.1	Are GC/MS Tuning and Mass Calibration forms present for bromofluorobenzene (BFB)?			×
3.2	Have all samples been analyzed within twelve hours of the BFB tune? If no, flag R.			×
				!
3.3	Have ion abundance criteria for BFB been met for each instrument used? If no. flag R.			*
				•

Noto:

# 4.0 Blanks (Method Blanks, Field Blanks and Trip Blanks)

(Code X - Field Blank Contamination, Code Y - Trip blank contamination, Code Z - Method blank contamination)

4.1 Isal	4.1 Is a Method Blank Summary form present for each batch?	X		
4.2 Do a	Do any method blanks have positive VOA results (TCL and/or TIC)?		X	
4.3 Do a	Do any field/trip rinse/equipment blanks have positive VOA results (TCL and/or TIC)?	×		
Actic	Action: Positive sample results <5X (or 10X for common volatile lab contaminants- methylene chloride, acetone, and 2-			
butar	utanone) the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory			
l. J., f	"J" flagged) concentrations.			
4.4 If Le	If Level IV, review raw data and verify all detections for blanks were reported.			

Note: The trip blank had detections above the MDL. Qualifications are listed below.

Code	Y	Y
New RE	_	-
Qualification	Ω	Ω
Analyte	Chlorobenzene	Chlorobenzene
Field ID	GM-18A	GM-18A-D

# 5.0 GC/MS Initial Calibration (Code C)

		Yes	No	NA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
53	Do any SPCC compounds have an RRF less than specification or any other compounds < 0.05 (use 0.01 for poor responders	<i>F</i> -		>
2:	like ketones or alcohols)? If yes, J(+)/R(•).	30.00		•
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			X
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			
				۱

Note:

# 6.0 Continuing Calibration (Code C)

		Yes	2°	₹ Z
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			x
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $<$ 20%)?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			x
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

||;

					Yes	S _o	NA
7.1	Are all sampl	les listed on the appropr	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	mmary Form ?	X		
7.2	Are surrogate	Are surrogate recoveries within acceptance	eptance criteria specified in the	criteria specified in the QAPP for all samples?	×		
7.3	If No in Secti	If No in Section 7.2, were these sample(s)	nple(s) or method blank(s) reanalyzed?	analyzed?			×
7.4	If No in Secti	If No in Section 7.3, is any sample dilution	filution factor greater than 10	factor greater than 10? (Surrogate recoveries may be diluted out.)			×
	Note: If SM(	C recoveries do not mec	et acceptance criteria in samp	Note: If SMC recoveries do not meet acceptance criteria in samples chosen for the MS/MSD or diluted samples, then no			
	reanalysis is required.	required.					
		> UCL	10% to LCL	<10%			
	Positive	J	ſ				
	Non-detect	None	ſſ	R			

Note

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

		ıes	res No NA	M
8.1	8.1 Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	×		
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?	ж		
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

Note: Sample GM-17B was analyzed as the MS/MSD.

# 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		Yes	- Š	Y Y
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X	İ	
9.4	If Level IV, verify the % recoveries are calculated correctly.			*
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td>-</td></lcl,>			-

### 10.0 Internal Standards (Code I)

					S	ţ.
10.1	Are internal standare	Are internal standard areas for every sample and blank within upper and lower QC limits?	nk within upper and lower	r QC limits?	X	
		Area > +100%	Area < -50%	Area < -10%		
	Positive	J	ſ	J		
	Non-detect	None	UJ	R		
	The method specific	ation is for the continuing calibi	ation to be compared to the	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to		
Note:	continuing calibratic	on. Thus, if all other QC specific	cations are met for a given	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment,		
	the reviewer may ch	he reviewer may choose not to flag individual samples in this case.	les in this case.			
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	econds of the associated ca	alibration standard?	X	
	Action: The chroma	atogram must be examined to de	termine if any false positiv	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large		
	magnitude, the reviewer may consider p	wer may consider partial or tota	I rejection of the data for I	vartial or total rejection of the data for non-detects in that sample/fraction.		

Note:

# 11.0 TCL Identification (Code W)

		2	2	
111	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing			,
1.1.1	calibration?			×
11 2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and			
11.2	do sample and standard relative ion intensities agree within 30%?			×

Note:

# 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		Yes	NO ON	¥ V
12.1	Are RLs used consistent with those specified in the QAPP?			x
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			×
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			

# 13.0 Field Duplicate Samples (Code F)

		2	110	1771
13.1	Were any field duplicates submitted for VOC analysis?		х	
13.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			Х
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Sample GM-18A-D was submitted as the duplicate sample for GM-18A

#### 14.0 Data Completeness

		Yes	No	NA
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	X		
14.2	Number of samples:			
14.3	Number of target compounds in each analysis:			
14.4	Number of results rejected and not reported:			
	% Completeness = $100 \times ((14.1 * 14.2) - 14.3) / (14.1 * 14.2)$			
	% Completeness 100			

# DATA VALIDATION WORKSHEET SEMIVOLATILE ORGANIC ANALYSIS

Project Number: Project Name: SDG No.: Severn Trent Laboratory - Savannah Bart Brandenburg 9/21/2005 Laboratory Reviewer: Date:

Sauget - Area 2 21561510.60011 SAS 032 Level III

Review Level:

#### Major Anomalies:

No samples were rejected

#### Minor Anomalies:

Field IDs:

Samples were qualified based on surrogate and internal standard recoveries.

MW-5B	GM-18A-D	MW-3B	SA-0-4
MW-5C	GM-18A	GM-17B	GM-6A
GM-5	GM-18B	GM-6B	SA-P-2

# 1.0 Chain of Custody/Sample Condition

		2	217	177
1.1	Do Chain-of-Custody forms list all samples analyzed?	x		
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X		
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×		
		_		

Note: The MS/MSD, surrogate, and internal standard had recoveries outside QC limits.

# 2.0 Holding Time/ Preservation (Code H)

	The state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the state of the s	- S	res No NA	Y
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10			
	^o C), then flag all positive results with a "J" and all non-detects "UJ".			
٠,٢	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time Table	0		
7:7	for sample holding time) If yes, J(+)/UJ(-).		×	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		X	
		,	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	

# 3.0 GC/MS Instrument Performance Check (Code T)

		X es	02	A Z
3.1	Are GC/MS Tuning and Mass Calibration forms present for DFTPP?			×
3.2	Have all samples been analyzed within twelve hours of the tune?			×
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
3.3	Have ion abundance criteria for DFTPP been met for each instrument used?			×
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

# 4.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		r es	res No NA	¥
4.1	Is a Method Blank Summary form present for each batch?	X		
4.2	Do any method/instrument/reagent blanks have positive results (TCL, and/or TIC)?		и	
4.3	Do any field equipment blanks have positive results (TCL, and/or TIC)?		×	
	Action: Positive sample results <5X (or 10X for phthalate contaminants) the blank concentration should be qualified "U" and the			
	detection limit elevated to the RL for estimate concentrations.			
4.4	If Level IV, review raw data and verify all detections for blanks were reported.			
1.4				

Note:

# 5.0 GC/MS Initial Calibration (Code C)

		Yes	ŝ	₹ Z
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			×
5.2	Are CCCs linear applying either %RSD 30% and all other compounds <15% or >0.990?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	Do any SPCC compounds have an RRF les than specification or any other compounds < 0.05 (use 0.01 for poor responders like amines and phenols)? If yes, J(+)/R(-).			×
5.4	Is the lowest standard at the same concentration, or lower, as the RL reported? If not, elevate RL.			×
5.5	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			1

## 6.0 Continuing Calibration (Code C)

		Les	0	<b>Y</b> Y
6.1	Are Continuing Calibration Summary forms present and complete?			×
6.2	Has a continuing calibration standard been analyzed every 12 hours?			×
6.3	Have all SPCCs and CCCs met method specifications? If not, comment in report, proceed to 6.4.			×
6.4	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration RRF outside QC limits (%D $< 20\%$ )?			×
	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.			
6.5	Do any compounds have an RRF < 0.05 (use 0.01 for poor responders)? If yes, J(+)/R(-).			×
9.9	If Level IV, calculate a sample of RFs and %Ds from each RF to verify correct calculations.			

### 7.0 Surrogate Recovery (Code S)

			Yes	°Z	NA A
7.1	Are all samples listed on the appropriate Surrogate Recovery Summary Form ?		¥		
7.2	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples and method blanks?			×	
7.3	Are more than one of either fraction outside the acceptance criteria?		×		
7.4	If Yes in Section 7.3, are these sample(s) or method blank(s) reanalyzed?			×	
7.5	If Yes in Section 7.3, is any sample dilution factor greater than 10?				×
	Note: If SMC recoveries display unacceptable recoveries in the MS and/ or diluted samples, then no reanalysis is required and acids	ired and acids			
	and base/ neutrals are assessed separately.				
	> UCL 10% to LCL <10%				
	Positive J J				
	Non-detect None UJ R				
Note:	Surrogate recoveries for one sample were outside QC limits. Qualifications are listed below.				

		_
Surrogate Limits	56-100 / 55-104 / 55-126	
Surrogate Recoveries	55 / 54 / 49	
Surrogate	2FP, PHL, TBP	
Field ID	GM-18A	

2FP = 2-Fluorophenol, PHL = Phenol-d5, TBP = 2,4,6-Tribromophenol

Code	S
Qualification	J/UJ
Analyte	All acid fraction SVOCs
Field ID	GM-18A

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Recovery - Code M, RPD - Code D)

			7.7	4 7 7 7
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
8.2	Are MS/MSDs analyzed at the required frequency not to exceed twenty field samples for each matrix?	X		
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria provided by the laboratory?		Х	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria			
	and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may require rejection.			
	RPD failures may be flagged "J" (+ only)			
	(fine ) and part of fine commercial			

Several analytes were outside QC limits for the MS/MSD sample GM-17B, however the LCS was within QC limits. No qualification of data was required. Note:

# 9.0 Laboratory Control Sample (LCS/LCSD) (Recovery - Code L, RPD - Code E)

		S	2	¥.
9.1	3.1 Is an LCS recovery form present?	x		
9.2	9.2 Is LCS analyzed at the required frequency for each matrix?	X		
9.3	Are all LCS %Rs (and RPDs) within acceptance criteria?	x		
	Action for specific compound outside the acceptance criteria: %R>UCL, J(+) only; <lcl, <10%="" j(+)="" r(-).="" rpd<="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			
	failures should be flagged "J" (+ only)			
9.4	J.f. Level IV, verify the % recoveries are calculated correctly.			

Note:

### 10.0 Internal Standards (Code I)

					res	INO	IVA
10.1	Are internal standare	d area of every sample and blan	k within upper and lower Q	Are internal standard area of every sample and blank within upper and lower QC limits for each continuing calibration?		x	
		Area > +100%	Area < -50%	Area < -10%			
	Positive	J	f	ſ			
	Non-detect	None	UJ	R			
	The method specific	ation is for the continuing calib	ration to be compared to th	he method specification is for the continuing calibration to be compared to the mid-point initial calibration, not sample to			
Note:	continuing calibratic	on. Thus, if all other QC specifi	ications are met for a given	continuing calibration. Thus, if all other QC specifications are met for a given sample, using informed professional judgment, the			
	reviewer may choos	reviewer may choose not to flag individual samples in this case.	in this case.				
10.2	Are retention times	Are retention times of internal standards within 30 seconds of the associated calibration standard?	seconds of the associated ca	alibration standard?	X		
	Action: The chroma	stogram must be examined to de	termine if any false positiv	Action: The chromatogram must be examined to determine if any false positives or negatives exist. For shift of a large magnitude			
į	the reviewer may co	the reviewer may consider partial or total rejection of the data for non-detects in that sample/fraction.	of the data for non-detects i	in that sample/fraction.	-		

One sample had internal standard recoveries below QC limits. Qualifications are listed below.

### 11.0 TCL Identification (Code W)

		res	ONI	NA
11.1	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			X
11.2	Are the three ions of greatest intensity present in the standard mass spectrum also present in the sample mass spectrum; and do sample and standard relative ion intensities agree within 30%?			х

Note:

# 12.0 TCL/TIC Quantitation and Reported Detection limits (Code K)

		1 53	110	T.
12.1	Are RLs used consistent with those specified in the QAPP?			X
12.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			X
12.3	Are TIC ions greater than ten percent in the reference spectrum also present in the sample spectrum?			х
12.4	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			х
12.5	If Level IV, calculate a sample of positive results to verify correct calculations			
]				

Note:

# 13.0 Field Duplicate Samples (Code F)

13.1	Were any field duplicates submitted for SVOC analysis?	Y
13.2	Were all RPD or absolute difference values within the control limits?	X
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.	
,		

Note: Sample GM-18A-D was submitted as the duplicate sample for GM-18A

#### 14.0 Data Completeness

			res	0	NA.
14.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	s sample, 90% for soil sample)	X		
14.2	Number of samples:	12			
14.3	Number of target compounds in each analysis:	65			
14.4	Number of results rejected and not reported:	0			
	% Completeness = $100 \times ((14.1 \times 14.2) - 14.3) / (14.1 \times 14.2)$				
	% Completeness	100			

# DATA VALIDATION WORKSHEET PESTICIDES/PCBs ANALYSIS

Reviewer: Bart Brandenburg

Date: 9/21/2005

Laboratory Severn Trent Laboratory - Savannah

Project Name:
Project Number:
SDG No.:

Review Level:

Sauget - Area 2 21561511.60011 SAS 032

Level III

Major Anomalies:

No samples were rejected.

Minor Anomalies:

Samples were qualified based on LCS recoveries.

Field IDs:

SA-0-4

SA-P-2

1.0 Chain of Custody/Sample Condition

		j	
1.1	Do Chain-of-Custody forms list all samples analyzed?	Х	
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×	
1.3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×	

The laboratory case narrative indicated that the LCS and surrogate recoveries were outside QC limits Note:

# 2.0 Holding Time/ Preservation (Code H)

		Yes	Ŝ	Y Y
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was			
	elevated (> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
, , ,	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Table for sample holding time) If yes, J(+)/UJ(-).	*******	X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		Å	
		2	A 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO 100 CO	

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

3.1 Is a Method Blank Summary form present for each batch?  3.2 Do any method blanks have positive results (TCL)?  3.3 Do any field/rinse/equipment blanks have positive results (TCL)?  Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.  RL for estimate (laboratory and at and verify all detections for blanks were reported.			Yes	No NA	NA
3.2 Do any method blanks have positive results (TCL)?  Do any field/rinse/equipment blanks have positive results (TCL)?  Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.  13.4 If Level IV, review raw data and verify all detections for blanks were reported.	3.1	Is a Method Blank Summary form present for each batch?	X		
3.3 Do any field/rinse/equipment blanks have positive results (TCL)?  Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.  3.4 If Level IV, review raw data and verify all detections for blanks were reported.	3.2	Do any method blanks have positive results (TCL)?		×	
Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the RL for estimate (laboratory "J" flagged) concentrations.  3.4 If Level IV, review raw data and verify all detections for blanks were reported.	3.3	Do any field/rinse/equipment blanks have positive results (TCL)?		X	
RL for estimate (laboratory "J" flagged) concentrations.  3.4 If Level IV, review raw data and verify all detections for blanks were reported.		Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
3.4 If Level IV, review raw data and verify all detections for blanks were reported.		RL for estimate (laboratory "J" flagged) concentrations.			
	3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

# 4.0 GC/ECD Instrument Performance Check (Code B)

		1.63	140	117
4.1	Are Endrin and 4,4'-DDT breakdown forms present?			Х
4.2	Have all samples been analyzed within twelve hours of the performance check sample?			Х
	If no, the data for the affected standards, blanks, field samples or QC samples are rejected "R".			
4.3	Have percent breakdown criteria (15%) for endrin and 4,4'-DDT been met?			х
	If no, all standards, blanks, field samples and QC samples are rejected "R".			

Note:

### 5.0 Initial Calibration (Code R)

		S	ONT	INA
5.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
5.2	Are response factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			x
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
5.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

# 6.0 Continuing Calibration (Code C)

		ទ	2	4	_
6.1	Are Continuing Calibration Summary forms present and complete?			×	
6.2	Has a continuing calibration standard been analyzed every 12 hours?			x	,
6.3	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D < $15\%$ )?			×	
	If yes, a marginal increase in response >20% then $J(+)$ only; a decrease in response then $J(+)/UJ(-)$ . For %D > 50%, flag R.			·	
6.4	If Level IV, calculate a sample of CFs and %Ds to verify correct calculations.				

### 7.0 Surrogate Recovery (Code S)

					Yes	No	NA
7.1	Are all sample	s listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	Form ?	X		
7.2	Are surrogate	recoveries within acceptanc	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	P for all samples?		×	
7.3	If No in Sectic	on 7.2, were these sample(s)	If No in Section 7.2, were these sample(s) or method blank(s) reanalyzed?	ζp			×
7.4	If No in Section	If No in Section 7.3, is any sample dilutio	on factor greater than 10? (Sur	illution factor greater than 10? (Surrogate recoveries may be diluted out.)			×
		> NCT	10% to LCL	< 10%			
	Positive	ſ	ſ	ſ			
	Non-detect	None	UJ	R			
Note:	One PCB sam	ple had recoveries above Qt	C limes. All analytes were rep	One PCB sample had recoveries above QC limes. All analytes were reported at non-detect; therefore no qualification of data was required.	a was require	ed.	

One PCB sample had recoveries above QC limes. All analytes were reported at non-detect; therefore no qualification of data was required.

# 8.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		ICS	IND	W
8.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?		×	
8.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?			×
8.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?			×
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC criteria and determine the need for qualification of the data for samples <i>from the same site/matrix</i> . Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

# 9.0 Laboratory Control Sample (LCS/LCSD) (Code L - LCS recovery Code E - RPD)

		Yes	No	NA
9.1	Is an LCS recovery form present?	X		
9.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
9.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?		×	
9.4	If Level IV, verify the % recoveries are calculated correctly.			
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td>-</td><td>•</td><td></td></lcl,>	-	•	

Note: The LCS had recoveries outside the QC limits. Qualifications are listed below.

		-
LCS Limits	40-123	
LCS recoveries	32	
Analyte	Endosulfan II	
TCS ID	LCS 680-17418	

Code	Л	T
Qualification	UJ	m
Analyte	Endosulfan II	Endosulfan II
Field D	SA-P-2	SA-0-4

# 10.0 TCL Identification (Code W)

NA		×
No		
Yes		
	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the	continuing calibration?

Note:

# 11.0 TCL Quantitation and Reported Detection limits (Code P)

		23	2	5
11.1	Are RLs used consistent with those specified in the QAPP?			×
11.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?			×
11.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".			×
11.4	If Level IV, calculate a sample of positive results to verify correct calculations			

# 12.0 Field Duplicate Samples (Code F)

		I GS	2	Y.
12.1	Were any field duplicates submitted for analysis?		×	
12.2	Were all RPD or absolute difference values within the control limits outlined in the QAPP?			×
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.			

Note:

#### 13.0 Data Completeness

		- Xe	Yes	Š.	NA
13.1	Is % completeness within the control limits? (Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil sample)	for soil	<b>.</b>		
13.2	13.2 Number of samples:				
13.3	13.3 Number of target compounds in each analysis:		 		
13.4	Number of results rejected and not reported:				
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)				
	% Completeness 100				

#### DATA VALIDATION WORKSHEET HERBICIDES ANALYSIS

Bart Brandenburg Reviewer: Date:

9/21/2005

Severn Trent Laboratory - Savannah Laboratory

No samples were rejected

Major Anomalies:

Project Number: Project Name:

21561510.60010 Sauget - Area 2

**SAS 032** 

Level III

Review Level:

SDG No.:

Minor Anomalies:

No samples were qualified based on this SDG.

Field IDs:

**GM-18B** GM-5

GM-6B SA-P-2

GM-18A GM-17B

MW-5C

GM-6A

GM-18A-D MW-5B

MW-3B SA-0-4

1.0 Chain of Custody/Sample Condition

1.1 D	Do Chain-of-Custody forms list all samples analyzed?	X	:
1.2 A	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	X	
1.3 Do	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×	

The laboratory case narrative indicated the MS/MSD had recoveries outside the QC limits.

# 2.0 Holding Time/ Preservation (Code H)

		I se s	0.0	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	(> 10 °C), then flag all positive results with a "J" and all non-detects "UJ".			
2.2	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding Time			
7:7	Table for sample holding time) If yes, J(+)/UJ(-).		X	
	Extraction: Soil/Sediment 14 days - aqueous 7 days Analysis: 40 days			
2.3	Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).		×	

Note:

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

		I ses	N0	NA
3.1	Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?	000000000000000000000000000000000000000	X	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.			
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			

Note:

## 4.0 Initial Calibration (Code R)

		Yes	°Z	₹ Z
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			x
4.2	Are calibration factors stable (%RSD values < 20% or >0.995) over the concentration range of the instrument			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate a sample of RRFs and %RSDs to verify correct calculations are being made.			

# 5.0 Continuing Calibration (Code C)

5.1 Are Continu			
	Are Continuing Calibration Summary forms present and complete?		x
5.2 Has a contin	Has a continuing calibration standard been analyzed every 12 hours?		×
Do any com 5.3 calibration (	Do any compounds have a % difference (or % drift for quantitation from a curve) (%D) between initial and continuing calibration CF outside QC limits (%D $<$ 20%)?		x
If yes, a ma	If yes, a marginal increase in response >20% then J(+) only; a decrease in response then J(+)/ UJ(-). For %D > 50%, flag R.		
5.4 If Level IV,	1f Level IV, calculate a sample of CFs and %Ds from each CF to verify correct calculations.		

Note:

## 6.0 Surrogate Recovery (Code S)

					x es	ON	NA
6.1	Are all sample	s listed on the appropriate	Are all samples listed on the appropriate Surrogate Recovery Summary Form?	Form?	X		
6.2	Are surrogate	recoveries within acceptan	Are surrogate recoveries within acceptance criteria specified in the QAPP for all samples?	PP for all samples?	X		
6.3	If No in Section	If No in Section 6.2, were these sample(s) or	s) or method blank(s) reanalyzed?	¿pe			×
6.4	If No in Section	on 6.3, is any sample diluti	on factor greater than 10? (Su	If No in Section 6.3, is any sample dilution factor greater than 10? (Surrogate recoveries may be diluted out.)			
		> UCL	10% to LCL	< 10%			
	Positive	J	J	J			
	Non-detect None	None	UJ	R			

Note:

# 7.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) or one MS with a Sample Duplicate (Code M - recovery, Code D - RPD)

		Yes	No	NA
7.1	Is a Matrix Spike/Matrix Spike Duplicate recovery form present?	X		
7.2	Are MS/MSDs analyzed at the required frequency of one matrix spike per ten samples and a duplicate per twenty for each matrix?	X		
7.3	Are all MS/MSD %Rs and RPDs within acceptance criteria specified in the QAPP?		x	
	Using informed professional judgment, the data reviewer should use the MS and MSD results in conjunction with other QC			
	criteria and determine the need for qualification of the data for samples from the same site/matrix. Recoveries <10% may			
	require rejection. RPD failures may be flagged "J" (+ only)			

The MS/MSD sample GM-17B had recoveries outside QC limits. The LCS was within QC limits; therefore, no qualification of data was required. Note:

		3	2	<b>1</b>
8.1	Is an LCS recovery form present?	Х		
8.2	Is an LCS analyzed at the required frequency of one per twenty field samples for each matrix?	X		
8.3	Are all LCS %Rs and RPDs within acceptance criteria specified in the QAPP?	X		
8.4	If Level IV, verify the % recoveries are calculated correctly.	-		
	Action for specific compound outside the acceptance criteria: %R>UCL,			
	J(+) only; <lcl, "j"="" (+="" <10%="" be="" failures="" flagged="" j(+)="" only)<="" r(-).="" rpd="" should="" td="" uj(-);=""><td></td><td></td><td></td></lcl,>			

Note:

## 9.0 TCL Identification (Code W)

		Yes No	No	NA
1.6	Is the relative retention time (RRT) of each reported compound within 0.06 RRT units of the standard RRT in the continuing calibration?			×

Note:

# 10.0 TCL Quantitation and Reported Detection limits (Code P)

NA

Š

Yes

		000000000000000000000000000000000000000	
10.1	Are RLs used consistent with those specified in the QAPP?		X
10.2	Are these limits adjusted to reflect dilutions and/ or percent solids as required?		x
10.3	Are any positives reported that exceed the linear range of the instrument? If yes, than flag "J".		х
10.4	If Level IV, calculate a sample of positive results to verify correct calculations		

Note:

# 11.0 Field Duplicate Samples (Code F)

11.1	Were any field duplicates submitted for herbicide analysis?	A	
	-		1
7:11	were all RFD or absolute difference values within the control limits outlined in the QAPP?	X	
	Action for specific compound outside the acceptance criteria: %R>50 (water), %R>100 (soil). J(+) only.		

Note: Samples GM-18A-D was submitted as the duplicate sample for GM-18A

NA

ž

Yes

#### 12.0 Data Completeness

12.1 Is % completeness within the control limits? (sample) 12.2 Number of samples: 12.3 Number of target compounds in each analysis:	within the central limite? (Control limit: Check OADD or use				
sample) 12.2 Number of samples: 12.3 Number of target co	WILLING THE COLLEGE THEORY (COLLEGE CHECK CAFF OF USE	(Control limit: Check QAPP or use 95% for aqueous sample, 90% for soil	Þ		
12.2 Number of samples: 12.3 Number of target co			•	·	
12.3 Number of target co	S:	12			
	ompounds in each analysis:	10			
12.4 Number of results re	Number of results rejected and not reported:	0			
% Completeness = 1	% Completeness = $100 \times ((12.1 \times 12.2) - 12.3) / (12.1 \times 12.2)$		:		
% Completeness		100			

# DATA VALIDATION WORKSHEET - Level III Review Inorganic - ICP, ICP-MS, GFAA, and CVAA

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
Date:	9/21/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 032
		Review Level:	Level III

#### Major Anomalies:

No samples were rejected

#### Minor Anomalies:

Samples were qualified based on method blank contamination.

MW-5B	GM-18A-D	MW-3B	SA-0-4
MW-5C	GM-18A	GM-17B	GM-6A
. GM-5	GM-18B	GM-6B	SA-P-2
Field IDs:			

# 1.0 Chain of Custody/Sample Condition/Raw Data

CVAA-Hg

ICP-MS

ICP

		Xes	<u>ž</u> 8	Yes   No   NA   Yes   No   NA   Yes   No   NA   Yes   No   NA	$\frac{Z}{2}$	4 Yes	ž	NA Y	es S	<u>্</u>	V
1.1	1.1 Do Chain-of-Custody forms list all samples that were analyzed?	×	-		$\vdash$				×	┝	1
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	×	_		-				×	╁	1
1.3	Do the traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples, analytical problems or special circumstances affecting the quality of the data?	×								<u>.</u>	T
1.4	Does sample preservation, collection and storage meet method requirement? (water samples: with Nitric Acid to pH < 2, and soil/sediment samples: $4 \text{ C} + 2 ^{\text{O}}\text{C}$ )	х							×		1
1.5	Are the digestion logs present and complete with pH values, sample weights, dilutions, final volumes, % solids (for soil samples), and preparation dates? For any missing or incomplete documentation, contact the Jahoratory for explanation/resubmittal	X							×		Ī
		380000000000000000000000000000000000000	$\frac{1}{2}$		1	222			2000		=

Note: The laboratory case narrative indicated that the method blank had detections above the MDL.

#### 2.0 Holding Time (Code H)

	Yes	No	es No NA Yes	8	No. NA Yes No NA Yes No	No	NA	Yes	Vo NA
Have any technical holding times, determined from date of collection to date of analysis, been exceeded? (Hg: 28days, other metals: 6 months) See attached Holding Time Table.	i g	X							×
Action: $J(+)/UJ(-)$ . If the holding times are grossly exceeded (twice the holding time criteria) $J(+)/R(-)$ .									

GFAA CVAA-Hg

ICP-MS

ICP

Note:

## 3.0 Instrument Calibration (Code C)

				•									
						ICP	)I	ICP-MS		GFAA		CVAA-Hg	.Hg
					Yes	No NA Yes		No N	No NA Yes		No NA Yes		No NA
3.1	Are sufficient standards included in the calibration curve? (ICP/ICP-MS: blank + one standard GFAA: blank + three standards; CVAA: blank + five standards)	alibration curve? lank + five standa	(ICP/ICP-MS: blaards)	ank + one standard;		*							
3.2	Are the correlation coefficients $> 0.995$ ? (for GFAA and CVAA) Action: $J(+)/UJ(-)$ .	for GFAA and C	VAA) Action: J(+	)/UJ(-).									x
3.3	Was an initial calibration verification (ICV) analyzed at the beginning of each analysis? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	V) analyzed at the iine affect on the	e beginning of eac data and note in re	h analysis? Action:		*							×
3.4	Was continuing calibration verification (CCV) performed every 10 analysis or every 2 hours, whichever is more frequent? Action: If no, use professional judgment to determine affect on the data and note in reviewer narrative.	CCV) performed o, use profession	every 10 analysis al judgment to det	on (CCV) performed every 10 analysis or every 2 hours, If no, use professional judgment to determine affect on the		×				New York			×
3.5	Are all calibration standard percent recoveries (ICV and CCV) within the control limits? Mercury (80%-120%) and other Metals (90%-110%).	coveries (ICV ar 0%-110%).	nd CCV) within	the control limits?		×							х
	Action: R(+/-)	J(+)/UJ(-)	J(+)	R(+)						22.28			
	Mercury <65%	962 - 46%	121% - 135% > 135%	> 135%									
	Other Metals < 75%	75% - 89%	111% - 125% > 125%	> 125%	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\								

Moto.

4.0 Blanks (Code O - Calibration blank failure, Code P - Preparation blank failure, Code X - Field blank failure)

			ICP	OI	ICP-MS	Ľ	GFAA		CVAA-Hg	-Hg
		Yes	No NA Yes		No NA Yes	Yes	No NA Yes	A Ye	s No	NA
4.1	Were preparation blank (PB) prepared at the appropriate frequency (one per 20 samples, per batch, per matrix and per level)?	×						×		
4.2	Are there reported PB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	×							×	
4.3	Were initial calibration blanks (ICB) analyzed? Action: If no, use professional judgment to determine affect on the data note in reviewer narrative.	X							, i	
4.4	Were continuing calibration blanks (CCB) analyzed after every 10 samples or every 2 hours whichever is more frequent? Action: If no, use professional judgment to determine affect on the data to note in reviewer narrative.	¥						*		
4.5	Are there reported ICB or CCB values > + IDL? Action: If yes, action level of 5 times the blank value are determined for positive and negative blank values.	X							×	
4.6	Are there samples with concentrations less than five times the highest level in associated blanks? Action: If yes, U at reported concentration.		×						×	
4.7	Are there samples with non-detect results or with concentrations less than five times the most negative value in associated blanks? Action; If yes, $J(+)/UJ(-)$ .		×						x	

Note: One target analyte value was detected above the IDL. Qualifications are listed below.

Code	P	P	P	P	P	P	Ы
New RL	-	•			•		•
Qualification	n	n	n	Ω	n	n	Ω
Analyte	Cobalt	Cobalt	Cobalt	Cobalt	Cobalt	Cobalt	Cobalt
Field ID	GM-5	GM-18A	GM-6B	MW-3B	SA-P-2	GM-6A	SA-0-4

# 5.0 ICP Interference Check Sample (ICS) (Code N)

							- 7	ICP		ICP-MS	MS	)	GFAA		CVAA-Hg	A-Hg	
		j	,				Yes	No N	A Ye	S NC	NA	No NA Yes No NA Yes No NA Yes	No	VA Y	es V	No NA	[A]
5.1	Was ICS A	B analyzed a	t beginning of	each ICP run (or	at least twice ever	Was ICS AB analyzed at beginning of each ICP run (or at least twice every 8 hours), and at the		<del>  '</del>						-	-	-	1
;	beginning c	or once every	8 hours (which	ever is more frequ	beginning or once every 8 hours (whichever is more frequent) for ICP-MS?	_		<u>-</u>	2) -								
5.2	Are the ICS	S AB recoveri	Are the ICS AB recoveries within 80% -	- 120%?				<u> </u>						$\vdash$	$\vdash$		
5.3	Are the resu	ults for unspil	ked analytes (in	Are the results for unspiked analytes (in ICS A) < + IDL?				<u> </u>						<del> </del>		-	
5.4	If not, are tl	he associated	5.4 If not, are the associated sample Al, Ca, F	Fe, and Mg conce	entrations less than	Fe, and Mg concentrations less than the level in the ICS?		×									
	Action:	Not Spik	Not Spiked Analytes	Spiked	Spiked analytes (ICS AB analytes)	analytes)							$\vdash$	$\vdash$	<del> -</del>		1
		<-IDT	>IDL	< 50%	50% - 79%	> 120%				7. S. S. S. S. S. S. S. S. S. S. S. S. S.					$\vdash$	$\vdash$	
,		(-)I	J(+)	R(+/-)	J(+)/UJ(-)	J(+)										$\vdash$	1

Note

# 6.0 Laboratory Control Sample (LCS) (Code L - Recovery, Code E - RPD)

CVAA-Hg

ICP

							Yes	<u>v</u>	\ Yes	Z °Z	Yes   No   NA   Yes   No   NA   Yes   No   NA   Yes   No   NA	2 %	VA Ye	s Nc	NA	
6.1	Was an LCS matrix and po	Was an LCS prepared and analyzed a matrix and per level)? Action: If no,	Was an LCS prepared and analyzed at the correct frequency (one per 20 samples, per matrix and per level)? Action: If no, J(+) any sample not associated with LCS results.	correct freque any sample no	ency (one per 20 of associated with	at the correct frequency (one per 20 samples, per batch, per 3, J(+) any sample not associated with LCS results.	×									T
6.2	Is any LCS 1 Sb; Solid lim	Is any LCS recovery outside the con Sb; Solid limits: as per EPA-EMSL/L	ide the control li A-EMSL/LV)	mits? (Aqueo	us limits: 80% -	Is any LCS recovery outside the control limits? (Aqueous limits: 80% - 120% - except Ag and Sb; Solid limits: as per EPA-EMSL/LV)		×						×		<del>                                     </del>
	Action:	So	Solid		Aqueous											Т
		< TCT > NCT	> NCL	< 50%	50% - 79% > 120%	> 120%										_
		J(+)/UJ(-)	J(+)	R(+/-)	J(+)/UJ(-)	J(+)							$\vdash$		XXX	

7.0 Laboratory Duplicates (Code K)

		T	ICP	11	.P-M	ICF-MS		GFAA		CVAA-Hg	-Hg
		Yes	Yes No NA Yes No NA Yes No NA Yes No NA	Yes	No	NA 1	/es	N of	A Ye	N	Ž
	Were Laboratory duplicates prepared and analyzed at the correct frequency (one per 20 samples,							$\vdash$			
7.1	per batch, per matrix and per level)? Action: If no, J(+), with professional judgment, analytes x	×							~		
	not associated with Duplicate results.					BLA					
7.7	Was a field blank used for the duplicate analysis? Action: If yes, J(+) with professional								_		3334.40
7:7	judgment. Note in worksheet.		<b>—</b>							×	3500 to 1
7.3	Are all analyte duplicate results within control? (RPD values $< 20\%$ or difference $< \frac{1}{2}$ PQL for									54	
j.	aqueous, and RPD $< 35\%$ or difference $< \pm 2$ X PQL for solids) Action: If no, J(+).	×							*		
	Note: RPD criteria is used when both sample and duplicate results are > 5 X IDL.		_			38.13		_			
						20			00000000	40000	

Note: All RPDs were within criteria, sample GM-17B was used as the duplicate sample.

# 8.0 Spike Sample Analysis -Pre-Digestion (Code M - Recovery, Code D - RPD)

CVAA-Hg

GFAA

ICP-MS

ICP

					Yes No NA Yes No NA Yes No NA Yes	N o	A Yes	No	NA S	(es )	No NA	Yes	οÑ	NA
8.1	Was a spiked s batch, per matri associated with	Was a spiked sample prepared and batch, per matrix and per level)? A associated with matrix spike results.	l analyzed at the correct free Action: If no, J(+), with pre	I analyzed at the correct frequency (one per 20 samples, per Action: If no, J(+), with professional judgment, analytes not	X							×		
8.2	Was a field blank Note in worksheet.	Was a field blank used for the MS Note in worksheet.		analysis? Action: If yes, J(+) with professional judgment.									×	
	Note: Matrix spik sample in an SDG.	e analysis may	be performed on a field bla	be performed on a field blank when it is the only aqueous										
8.3	For all analytes with the control limit of spike concentration.)	For all analytes with sample concenthe control limit of 75-125%? (Nospike concentration.)	itration < 4 x spike concentro control limit applies to ar	For all analytes with sample concentration $< 4 \times$ spike concentration, are spike recoveries within the control limit of 75-125%? (No control limit applies to analytes with concentration $> 4 \times x$ spike concentration.)	X							×		
		%R > 125%	30% < %R < 74%	%R < 30%							_			
·	Positive	J	J	ſ	7,77	_		1,000%						
	Non-detect	None	UJ	R										

Note: Sample GM-17B was spiked and analyzed, all recoveries were within QC limits.

## 9.0 Instrument Detection Limits (IDL)

ICP
Yes
Assessment of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of the second of th

9.1 Note:

### 10.0 ICP Serial Dilutions (Code S)

		1	ICP		ICP-MS	LS.	9	GFAA		CVAA-Hg	-Hg
		Yes	No	Yes No NA Yes No NA Yes No NA Yes No NA	No	NA	Yes	No	IA Yes	No.	N
0.1	Were serial dilutions performed?	и							<u> </u>		
0.2	10.2 Was a five-fold dilution performed?	×							<u> </u>		
10.3	Did the serial dilution results agree within 10% for analyte concentration > 50 x the IDL in the	×									

Note: Samples GM-17B and GM-18A were diluted and analyzed, all %Ds were within QC limits.

## 11.0 Field Duplicate Samples (Code F)

			ICP		ICP-MS	_	GFAA	_	CVAA-Hg	Hg
		Yes	No	NA Yes	No NA Yes No NA Yes No NA Yes No NA	4 Yes	No	AA Yes	No	NA
11.1	Were any field duplicates submitted for metal analysis?	X						×		
11.2	Are all field duplicate results within control? (For aqueous sample, RPD values $< 50\%$ or difference $< + 2 \times PQL$ and for solids, RPD $< 100\%$ or difference $< + 4 \times PQL$ )	J.						×		

te: Sample GM-18A-D was submitted as the duplicate sample for GM-18A.

### 12.0 Result Verification (Code Q)

			ICP	ICI	ICP-MS	G	GFAA	_	CVAA-Hg	.Hg
		Yes	No NA	Yes	No NA	Yes	No N	A Yes	%	NA
12.1	Were all results and detection limits for solid-matrix samples reported on a dry-weight basis?		×						(A. 1)	×
12.2	Were all dilution reflected in the positive results and detection limits?		х						1258	×

#### 13.0 Data Completeness

	Is % completeness within the control limite? (Control limit: Chan on use 060, for					
13.1	aqueous sample, 90% for soil sample)					
13.2	13.2 Number of samples:	12	0		0	12
13.3	Number of target compounds in each analysis:	22	0		0	-
13.4	Number of results rejected and not reported:	0	0		0	0
	% Completeness = 100 x ((13.1 x 13.2) - 13.3) / (13.1 x 13.2)			•		
	% Completeness	100	####		####	100

#### DATA VALIDATION WORKSHEET WET CHEMISTRY ANALYSIS

Reviewer:	Bart Brandenburg	Project Name:	Sauget - Area 2
Date:	9/21/2005	Project Number:	21561510.60011
Laboratory	Severn Trent Laboratory - Savannah	SDG No.:	SAS 032
Test Name:	Ammonia, Chloride, Nitrogen, Sulfate, TOC, dissolved gases	Review Level:	Level III
Method No.:	350.1, 325.2, 353.2, 375.4, 415.1, RSK-175		

#### Major Anomalies:

No samples were rejected

#### Minor Anomalies:

Field IDs:

No samples were qualified in this SDG.

MW-5B	GM-18A-D	MW-3B	SA-0-4
MW-5C	GM-18A	GM-17B	GM-6A
GM-5	GM-18B	GM-6B	SA-P-2

# 1.0 Chain of Custody/Sample Condition

		Ves	Ž	Z
			21.7	1 12 1
1.1	Do Chain-of-Custody forms list all samples analyzed?	¥		
,				
1.2	Are all Chain-of-Custody forms signed, indicating sample chain-of-custody was maintained?	*		
		•		
1 3	Do the Traffic Reports, chain-of-custody, and lab narrative indicate any problems with sample receipt, condition of samples.	** <u>*</u>		
J.:1	analytical problems or special circumstances affecting the quality of the data?		M	
Note:	No anomalies were reported in the laboratory case narrative.			

No anomalies were reported in the laboratory case narrative.

2.0 Holding Tin	2.0 Holding Time/ Preservation (Code H)	Yes	Š	NA
2.1	Do sample preservation, collection and storage condition meet method requirement?	X		
	If samples were not on ice or the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated			
	$(>10^{0})$ C), then flag all positive results with a "J" and all non-detects "UJ".			
ć	Have any technical holding times, determined from sampling to date of analysis, been exceeded? (See attached Holding			
7:7	Time Toble for comme helding time 10.000 10.000 10.000		×	

Note:

2.3

# 3.0 Blanks (Method Blanks and Field Blanks) (Code X - Field Blank Contamination, Code Z - Method blank contamination)

Have any technical holding times grossly (twice the holding time) been exceeded? If yes, J(+)/R(-).

Time Table for sample holding time) If yes, J(+)/UJ(-).

		3	2	<b>5</b>
3.1	3.1 Is a Method Blank Summary form present for each batch?	X		
3.2	Do any method blanks have positive results?		×	
3.3	Do any field/rinse/equipment blanks have positive results?		X	
	Action: Positive sample results <5X the blank concentration should be qualified "U". The result should be elevated to the			
	RL for estimate (laboratory "J" flagged) concentrations.	_		
3.4	If Level IV, review raw data and verify all detections for blanks were reported.			
Maker				

Note:

# 4.0 Initial Calibration (Code C)

		Yes	No	NA
4.1	Are Initial Calibration summary forms present and complete for each instrument used?			X
4.2	Are correlation coefficients stable (>0.995) over the concentration range of the instrument?			×
	If not, J(+)/ UJ(-). In extreme cases, the reviewer may flag non-detects "R".			
4.3	If Level IV, recalculate the correlation coefficient to verify correct calculations are being made.			

Note:

8/8/2006